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ABSTRACT

Focusing on the philosophical and sociological bases of reading, the papers in this volume were drawn from the fourteenth annual meeting of the National Reading Conference held in 1964. Among the topics covered in the 27 papers are the following: the philosophy and sociology of reading; reading reform; adult literacy; paperback books; factors in critical reading; ego strength and reading disability; contributions of college reading specialists to precollege reading programs; public school development of reading programs; the reading needs of college preparatory students; attitudes of parents of superior and inferior readers toward certain child rearing practices; reading tests; college reading programs in Louisiana and Mississippi; the cloze procedure; the evolution of the Purdue University, Western Reserve University, and Minnesota reading programs; motility training; eye movements and reading; research on adult reading; and behavior analysis. (FL)

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THE PHILOSOPHICAL and SOCIOLOGICAL
BASES of READING

FOURTEENTH YEARBOOK OF THE
NATIONAL READING CONFERENCE

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PREFACE

The Fourteenth Yearbook of the National Reading Conference contains the papers presented at the Fourteenth Annual Meeting which met at Southern Methodist University, Dallas, Texas, on December 3-5, 1964.

The papers have been compiled generally in the order in which they were introduced at the Conference. The first four articles were the invitational addresses and the major address presented at the dinner meeting. The next three reports were presented at the session on psychological and sociological trends. These were followed by three presentations concerned with pre-college reading programs. Four research reports followed. The cloze procedure in college-adult reading included the three papers presented on this subject. Next, four research reports were presented. This was followed by four discussions of the evolving college reading program. The final three articles on research and evaluation culminated with the annual comprehensive summary of research in college-adult reading.

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The Philosophy And Sociology Of Reading

Emerald Dechant

Fort Hays Kansas State College

As we begin this paper, we feel a little like the nineteenth-century French mathematician Lagrange. After he had read a few words, he suddenly stopped, frowned a bit, folded his paper, and remarked: "Gentlemen, I must think further about this."

Despite our apprehensions, we should like to open this discussion at the point where Poionius asked Hamlet: "What do you read, my lord?" and Hamlet answered him: "Words, Words, Words." Is it just a mere matter of words? This is an epistemological question—a philosophical question. It proposes a distinct theory of reality. It raises doubt about the *relationship* between the world of immediate experience on the one hand and the world of language on the other, between things and words, between events and speech. It opens up the problem of the nature of meaning, which is surely the first problem in a philosophy of language, and indirectly in a philosophy of reading.

It may be difficult and ultimately misleading to try to isolate a linguistic philosophy, but today philosophers and linguists both concern themselves with this issue. There seems to be general agreement that philosophy deals with that meaningfulness which is utilized in communication. Today's philosopher concerns himself with linguistic significance.

Before it is possible to discuss the nature of meaning, we must ask certain questions without which there is neither philosophizing nor thinking. Is there an objective reality apart from the perceiver? Is there a dichotomy between inner and outer reality, between subject and object? Can man come to know this reality apart from himself? Is reality the object of the intellect? Is there a continuity between internal experience and the external world?

The answers to the questions do not come easily. A positive answer to each of them implies that the concept by which intellect knows reality at least partially corresponds to reality. It suggests that what is given to the mind at least approximates reality. Yet, reality is individual and the concept is universal. The word, which expresses the concept, is no less universal than is the concept.

The history of philosophy is a history of either accepting or rejecting such answers. It is replete with high or low evaluations of language or the word. High evaluations are associated with the inseparability of the word and concept and thing or reality; low evaluations, with the separation of the word and concept and the thing.

Common man, unlike the philosopher, has always believed in a reality distinct from the perceiver, in man's ability to know this reality, and in man's ability to communicate his knowledge of reality through the use of either the spoken or the written word. He has always accorded the word a high evaluation. He has had a high trust in language.

The early Greek philosophers questioned such common-place observations. Thaïes and Heraclitus sought to identify the nature or the *Urstoff* of all reality. Heraclitus (c500 BC) reached the conclusion that the only constancy or permanent aspect of reality was its changeability. He believed that all things were in a state of flux and that no one could step twice into the same river. Imagine if you will a snowball rolling down a hillside. Then abstract everything but pure rolling and you have an idea of the nature of things.

Parmenides (c540 BC) of Elea thereupon denied change and termed it an illusion of the senses. He suggested that there was only being and that being was intelligible only through the intellect. Heraclitus had denied that the intellect could know anything except change and this was essentially sense-knowledge; Parmenides had denied that the senses could know anything worth knowing. The one had denied intellect; the other, the validity of the senses.

The natural outgrowth of this debate was the skepticism of the Sophists. Georgias held that nothing exists and that if anything did exist, it could never be known. Obviously, if reality cannot be known, it cannot be communicated. With such a conception, language becomes, as Anatole France suggested, "the cries of the forest corrupted and complicated by anthropoid apes." It becomes an organ of adaptation to the environment, not a vehicle of real knowledge and of reality.

Skepticism forced philosophers to take a new look at language. What is language? Is it the God-given handmaid of reason (Schlegel) or a form of animal behavior (Anatole France)? Does language mirror the world or does it merely belong to the realm

of subjective opinion and convention? Does language bear meaning, is it a medium of communication, and is it a symbol of reality? Is there a genuine connection between the word and reality? Or is language "a veil hiding truth and self-deception?"

The view of the Sophist was not permitted to go unchallenged. Socrates (470-399 BC) concerned himself not only with the *Urstoff* of reality, but with the validity of language. He asked not only: "What is the World?" but also "How can one know what it is and how can this knowledge be communicated?" He was concerned with the *meaning* of justice, knowledge, and the good. He sought to reestablish a trust in language.

Plato epitomized man's attempt to find permanence in a universe of change. He affirmed that knowledge of reality or truth was attainable, that the senses give only relative truth, but that true knowledge is of the universal. He separated the world of thought from the world of reality and suggested that change and permanency could coexist. He accepted reality, but rejected Parmenides' reality without change. He grappled with the "individuality of things and the generality of language."

Aristotle suggested that concepts such as truth, beauty, and goodness are concepts of the mind, but that they express something in external reality. He proposed an objective foundation for the subjective universal in the mind, for the concept, and for the word that expresses the concept. He maintained that concepts, even though conceived by thinkers, are exemplified in particulars. Aristotle admitted change, but asserted that there had to be a thing that changes. He suggested that movement without a substance moving is nonsense.

The opinions of Aristotle were dominant until they were challenged during the middle ages by the Nominalists, under the leadership of William of Occam, who denied all universals, and eventually by the empiricists of the eighteenth century, by the Darwinian naturalists, and by the Neonominalists.

We have traced briefly high and low evaluations of the word. We have seen that some philosophers concluded that man can know reality and that he can communicate it; others denied both reality and the intelligibility and the communicability of reality.

There is no way to prove the validity of the mind. Reality and the validity of the mind are, if anything, self-evident truths. The

"intelligible world is the real world in the only sense that real has any meaning for us." (17, p. 729) We should not be upset that the measurable is not necessarily identical with the significant, (10) and Pascal notes that "we should not judge the truth of things by our capacity to conceive them."

What separates man from animal? We might argue that it is man's mind, his intellect, his brain, or his reason, but we have difficulty describing what we are talking about. It is much simpler to point a finger at the behavioral effect of reason, namely language. Wilhelm Von Humboldt wrote that man is man only because of language; perhaps, it might be more correct to say that man had to be human to invent language. Without man, there is no language. (14, p. 6-7)

But language has to be about something. The basic function of language is the "communication of words or groups of words for the purpose of mutual understanding." (14, p. 16) Words must mean something. Unless we know the world of reality, and unless words express this reality, we are just bantering about words. Whatmough notes:

... If the deliberate fault of postulating a direct connection between symbol and referend is committed, or if this is done innocently by the unsophisticated, it gives rise to the dangerous illusion that by manipulating the symbols it is possible to manipulate the referends. . . . *Another danger is to exclude the referend. Here we have the vicious practice of verbalism, of moving repeatedly from symbol to cerebral construct and back again, of responding entirely to one's own verbal response.* (18, p. 178-179)

The Chinese philosopher, Hsun Tzu noted that "Names have been fixed to denote realities. . . . They have a content "determined by an identity of reaction in man . . . to the same things, to the same stimuli." (2, p. 13) The identity of reaction by various humans to words gives them a value, a certain inevitable constancy that undergrids all human certainties. "The word, thus laden with the experience of the ages, becomes an entity which is neither [wholly] equivocal nor ambiguous and on which rest social and moral relations between men." (2, p. 13)

DeLaguna goes so far as to posit a necessary connection between concept and language. She notes that "If an animal cannot express its thoughts in language, that is because it has no thoughts to express; for thoughts which are not formulated are something less than thoughts." (7)

And, Langer adds:

Language is, without a doubt, the most momentous and at the same time the most mysterious product of the human mind. Between the clearest animal call of love or warning or anger, and a man's least trivial word, there lies a whole day of Creation—or in modern phrase, a whole chapter of evolution. *In language we have the free, accomplished use of symbolism, the record of articulate conceptual thinking; without language there seems to be nothing like explicit thought whatever.* All races of men—even the scattered, primitive denizens of the deep jungle, and brutish cannibals who have lived for centuries on world-removed islands — have their complete and articulate language. There seem to be no simple, amorphous, or imperfect languages, such as one would naturally expect to find in conjunction with the lowest cultures. People who have not invented textiles, who live under roofs of pleated branches, need no privacy and mind no filth and roast their enemies for dinner, will yet converse over their bestial feasts in a tongue as grammatical as Greek, and as fluent as French! (11, p. 103)¹

What implications do these statements have? They imply that language is a sign or symbol of reality. If it is not this, language cannot serve as a vehicle of communication and as a bearer of meaning. It is because we have *philosophically accepted the proposition that words convey meaning*, because we have a high evaluation of the word and especially of the sentence, which is the unit of linguistic utterance, and because we are willing to make the assumption that words do communicate and that they communicate something, that we can speak of a sociology of reading and language. A sociology of reading makes sense only if the words on the printed page communicate meaning. If the words did not communicate, we should not use language as the major vehicle of interaction with others and we should not be concerned with the effects that reading has on the reader.

Maritain makes an additional point. He suggests that language is the use of a sign "*as involving the knowledge or awareness of the relation of signification. . .*" (13, p. 90) He defines sign as "something that makes something other than itself present to knowledge." (13, p. 86) The key words in Maritain's definition of language are surely the words, "awareness of the relation of signification." Bees use signs, but only man knows that the signs he uses are signs.

In emphasizing the role of language as an instrument for the communication of thought or meaning (its referential role), we

¹The italics are not in the original.

are not negating or minimizing its expressive role. Indeed, the latter role may be the primary role of language. Sapir notes:

The autistic speech of children seems to show that the purely communicative aspect of language has been exaggerated. It is best to admit that *language is primarily a vocal actualization of the tendency to see reality symbolically.* . . . (15)

Let us concentrate for a moment on the social role of language. Man, destined for social interaction, needs communication, and while he may use other forms of communicating, his social interaction is essentially linguistic. (12, p. 188)

Language and writing exist for the *social* manifestation of thought. Language arose when man attempted to communicate his thoughts. Language thus arose from the needs of humanity and the nature of man. Man's use of words to express his thoughts and concepts is *natural* and derives from man's peculiar propensities. Words are *conventional* only in as far as *this* particular word signifies *this* particular concept.

Language needs a social context and must have social effects. Language grew and continues to grow in and through society. It is the basis for group communication and living. A word that has a private definition does not communicate. It then represents a perceptual experience in the raw and is "doomed to be a gem serene, locked in the silence of private experience." (5)

Dewey noted that "Language . . . is the medium in which culture exists and through which it is transmitted." (8, p. 20) In other places he noted that men without language would be sub-human animals. He felt that words come into existence through cooperative action for a common purpose. Because man is an *animal sociale* and because man sought to accomplish social tasks, it became necessary to develop symbols.

The social role of language is illustrated in other ways. The mastery of speech is a prerequisite to full participation in society. Through language the child acquires beliefs and attitudes. Speech initiates the child into a community and provides a feeling of belonging. Language, for example, is a sign of the social solidarity of those who speak it—of the family, the club, the union, or the gang. When we say of a person that "he talks like us" we mean "he is one of us."

What we have said about language applies with equal force to writing and reading. Reading is a language process. (6) Man

interacts with his fellow man through speech and writing, through listening and *reading*. Listening is the other half of talking; and reading is the other half of writing. A culture becomes a civilization only when it possesses a written language and when there are *readers* of the history of that culture. (9)

When writing and reading became a means of communication and of recording and encoding facts, a sociology of reading was born. We became concerned with who reads *what* and *why*. We became concerned with the ways and means by which reading might promote individual welfare and social progress. An immediate interest developed in such questions as: motives for reading; amount and kind of material read by members of different social classes; levels of difficulty of reading materials; and social effects of reading.

As a result of various inquiries into these questions, the social role of reading became unmistakably clear. It has been adequately demonstrated that reading is both a social and a socialization process. Reading quite frequently is done in a social group and always involves some degree of social interaction between the writer and the reader. Furthermore, in our society unless a child can read, he does not perceive himself to be an "enfranchised" member of the group or society.

Let us briefly allude to just a few interrelationships with which a sociology of reading might deal.

1. *Reading is an indispensable means of communication in a civilized society.*
2. *Reading materials, the amount and the types of material read, the motives for reading, the levels of difficulty of reading materials, and the skill with which one reads are to a great degree socially determined.*

Even a cursory look at our past shows that significant changes in motives for reading have occurred. (16) In colonial days the motives were religious; in 1776, with the birth of a nation, came a desire to understand the new form of government; by 1825, there arose a desire to understand the new frontier; by 1885, interest was centered on culture and literature; and since 1910, concern has been directed toward personal, social, and world problems.

We also have found that the amount and kinds of reading are different in different sections of the country, among various oc-

cupational groups, and among individuals of various socio-economic groups. In fact, Barton (3) found in a survey of 1200 teachers that "the most important single factor in reading in school is socio-economic class. . . . When we divide our classrooms according to the socio-economic status of the pupil's parents (using a combination of income and occupation) we find that reading retardation—as measured by the class average—rises steadily through the first six grades for classrooms of mainly working-class children, and especially severely for the lower-skilled, lower paid part of the working class."

The evidence shows that Negro children do not read as well as white children on an average, not because of an absence of symbolic activity, but because the Negro, especially from lower-socio-economic groups, has a different cultural base in which the language is different from that of the middle-class white person.

3. *The language and the meanings that are ascribed to spoken and printed materials are determined partially by the social context.*

The evidence shows that culture affects language, and language in turn affects culture and thought habits. Whorf has demonstrated that where a culture and a language have developed together, there are significant interrelationships between the general aspects of the grammar and the characteristics of the culture as a whole. The social organization and prevailing modes of thought in a society leave their imprint on language. Social selection gradually determines which phones become phonemes, what the vocabulary of the language shall be, and what the sentence structure shall look like.

Vocabulary differences are related to the environment. Eskimo languages have thirty words for different kinds of snow; we have only one; the Aztecs use the same word for cold, ice, and snow. (19, p. 6) The Paiute, a desert people, have a language that permits detailed description of topological features, a necessity in a country where complex directions are needed for the location of water holes.

The changes are not confined simply to the vocabulary or grammatical differences. The language itself, the words and the idioms, frequently becomes encrusted with historic and cultural meaning. The word "crusade", for example, in our culture means

"a crusading spirit" or an enthusiasm such as might be manifested in a "crusade for freedom". Translated into German, it becomes *Kreuzzug* and is identified with the Holy Wars of the Middle Ages. The word "compromise" since World War II has come to mean "an unsatisfactory and possibly cheapening outcome which pleases nobody." (1, p. 127) The simple fact is that "every society meets a new idea with its own concepts, its own tacit, fundamental way of seeing things." (11, p. 6)

4. *The vocabulary and ideas acquired through reading may give rise to vital social and personal changes.*

We have evidence, although indirect, which suggests that the world itself appears different to a person using one vocabulary rather than another. Vocabulary influences a person's perceptions. A Chinese Aristotle probably would not have been able to formulate the system of ideas that a Greek Aristotle did. Vocabulary tells what features of the environment to pay attention to. The language of the people is a key to the concepts shared by members of a given culture, and changes in language reflect a change in concepts. "Language is indispensable not only for the construction of the world of thought but also for the construction of the world of perception, both of which constitute the ultimate nexus of an intelligible communion, spiritual and moral, between man and man." (1)

Our experience tends to indicate that reading does in fact affect the social understandings, interests, attitudes, beliefs, judgments, morals, and behavior of the reader. Words mold men's thinking, direct action, and permit us to share genius. Speech, writing, listening, and reading are prerequisites to full participation in society. There may be simian geniuses, but they cannot pass on their knowledge to their successors.

Reading can and often does serve as a tool for personal growth and adjustment, and we use the term *bibliotherapy* to describe this process. Reading frequently helps the reader to overcome insecurity based on his relations with his peers or with his family. It may help him to deal with failures. It may help him to accept himself for what he is, to obtain insights into his own problems, and to evaluate his own strengths and weaknesses.

Reading may be a unifying force in that it provides common vicarious experiences and cultivates common attitudes, ideals, in-

terests, and inspirations, but it also may be a disintegrating force by giving exposure to divergent ideas and feelings.

In closing, let me raise a few questions:

1. Is there a need for a more socially-oriented definition of reading and if there is, what might such a definition be like?

2. Have we fully investigated the culture-climates of the school and the affect that these have on reading achievement?

3. What are the cultural horizons of our school children and how do these affect their ability to bring meaningful concepts to the symbols on the printed page?

4. Why is it that there is and always has been a conflict between the literature that the adult believes is "good for the child" and that which children read of their own initiative? What are the characteristics of "Saturday Night on Madison Street" that make the pupil want to read it rather than the "Dick and Jane" type and how can we make the "Dick and Jane" story take on the good characteristics of "Saturday Night on Madison Street?"

5. What effect does the reading of certain types of materials have on the development of childhood? Do stories dealing with criminal behavior, with promiscuity, and sexual aberration tend to promote the "spirit of crime" and delinquency in some children and may they permit the delinquent child to rationalize his own actions? If reading has therapeutic effects as above described and if it may foster personal and social development, then it may be unwise to ignore the possibility that unwholesome books pose a threat to the reader's wholesome development. A sociology of reading suggests that the child at least partially becomes what he sees, hears, and reads. Some reading certainly seems to disarm the reader morally. What effect does the literature of despair, hate, sex, and violence, as seen in Spillane or Hemingway, a literature reeking of concentration camps, a literature screaming with tangled nerves, or a literature that crushes the human spirit and engulfs humanity in atomic destruction as portrayed by Wells have on the reader? What effect has a literature on our culture that devoids sex behavior of guilt, conflict, or responsibility and indeed of joy? What is the impact of a literature in which there is neither right nor wrong, perhaps only maladjustment, and where the cry is for a bigger and sweeter lollipop that tastes just awful? (9, p. 574)

6. Why is it that the so-called "common man" has a real concern over such books as *Tropic of Cancer*, but that the "edu-

cational elite" quite frequently do not share this concern or at least have not devoted perhaps a fit amount of time to the resolution of the common man's intellectual conflict?

Although some of the questions above sound almost like sermonizing, it seems the time has come to look at reading a bit more closely. Perhaps for too long we have concerned ourselves simply with the teaching of reading as a medium for learning and have ignored the fact that any medium or technique can be used for good or bad. Teaching a boy to drive a car means teaching him the mechanics of driving, but also the social and moral obligations that go with driving. Does it make any sense to teach reading without at the same time trying to instill the desire to read that which uplifts man? Reading, it seems, must be wed to end goals that are worthy of the potential and dignity of man and that are consonant with his final goals. When we are thus concerned with the effects of reading, we are indeed dealing with the philosophy and sociology of reading.

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Recent Proposals For Reading Reform

David Kopel

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The Climate of Reform

The history of American reading instruction reveals a continuing search for improvement in methods, materials, and teachers. That search goes on, marked in recent years by a special note of urgency and even of hysteria. The reasons, of which there are a veritable network, derive mainly from the concurrent explosion of knowledge in the 20th century and the rising aspirations of people for the good life. Notable too is an underlying and ever stronger conviction, entirely in the American tradition, that equality of opportunity in the society at large must begin in the schools. Stemming from these developments, we find at every social stratum an intensified discontent with educational weaknesses and inequities that are perceived as barriers to vital goals. The expressions of dissatisfaction blend with positive attitudes toward the schools and the mixtures vary with socio-economic class.

The Role of Class

Among the lower socio-economic groups the reading abilities of adults lag behind even their limited educational levels; their reading is confined largely to newspapers and pulp magazines, and their children learn slowly and reluctantly. Adult feelings are often quite ambivalent, compounded of faith in education with mistrust of teachers and schools. (20) The mistrust comes from discouragement and disappointment; it reflects the all too frequent lack of relevance and reward in the typical school experience of both the older and younger generations; and some of the negative feeling is transmitted by parents to children. Where ambivalence turns to overt hostility, as is increasingly common today, it is coupled with the growing awareness of discriminatory and prejudicial practices in the schools. Reading instruction, however, is rarely singled out as a target of criticism.

With few exceptions members of the middle and upper classes believe in education as the chief vehicle for social progress and individual advancement. These classes, by and large, and particularly the professional and managerial groups, read well and

enjoy reading, and have children who learn readily. Within these socio-economic groups, some dissatisfaction with reading instruction derives of course from the well-publicized and considerable reading retardation in nearly all elementary and high schools, and even in many colleges, throughout the land. Ironically, the prevalence of remedial programs tends to confirm the predisposition to believe, when it exists, that reading instruction has broken down.

Other adult criticism results mainly, I believe, from the frustration of not being able to read enough. This feeling is one I am sure all participants in this conference have experienced—of being barred from an abundance of literary riches which we cannot enjoy for lack of time or skill, and of being overwhelmed by a flood of informational and technical material which we need desperately in order to keep abreast of the changing world, but which threatens by its magnitude to lose us.

Not infrequently, for some middle-class citizens, reading instruction is but one convenient target in their broad-gauged censure of the total educational program, which they regard as substandard and deteriorating in quality. That this is a mistaken belief, especially as it relates to the schools attended by their own children, has been demonstrated by the research of Arthur Gates (12, p. 23), and of others. Nevertheless, as the criticisms persist, the schools, and reading instruction in particular, continue thus to serve a time-honored but little noted function of scapegoat for the social, economic, and political malaise of the times. Current attacks reflect and focus the anxieties generated internationally by cold-war crises, and domestically by various deep concerns—such as mounting crime, creeping inflation, changing sexual mores, unemployment and the impact of automation, racial unrest, and urban decay.

Proposals for Reform

In this context an upsurge of proposals for the reform of education and especially of its most significant and pervasive single facet—reading instruction—is to be expected. Prominent among the measures that have been advocated during the past decade—not always for the first time—are traditional phonics, individualized reading, speed reading, programed reading instruction, simplified alphabets, structural linguistics, neurological retraining, early (pre-school) reading instruction, and pre-school language programs. I shall comment briefly on these varied proposals.

Traditional Phonics. By "traditional phonics" I refer to the notion in vogue many years ago that initial reading instruction must consist largely of practice in learning the sounds of the alphabet. This method is contrasted with the whole-word or look-and-say method in which phonic instruction is deferred and minimized. The latter emphasis is held largely responsible for poor reading achievement wherever it occurs. This position has been set forth strongly and notoriously by Rudolph Flesch (9, p. 222). It has been effectively refuted by Theodore Clymer (4) and others (13). A sound, middle-of-the-road position has been expressed very recently in an article by Josephine Piekarz entitled, appropriately, "Common Sense About Phonics." (18) Piekarz argues convincingly that phonics instruction is useful, indeed indispensable, but it is by no means the only valuable or necessary technique in teaching children to read. This conclusion, like the whole controversy over phonics, is anything but novel. Actually, phonics instruction has always been part of the armamentarium of techniques used by virtually all reading teachers. Some have given it more emphasis, others less. As a preponderant method it has been rejected in theory and found wanting in practice, recent enthusiasts and phonics to the contrary notwithstanding.

Individualized Reading. Like the squabble over phonics, the controversy over individualized versus developmental reading is also largely a controversy over semantics and emphasis. Extreme proponents of individualized reading would not only have instruction tailor-made for each child; they would also ban the use of group materials such as basal readers and workbooks. However, there exists a widespread consensus which acknowledges the need for continued developmental reading programs through at least the high school years, together with the desirability of adapting instruction in accord with characteristics of the individual pupil. (27) In this middle-ground approach beginning instruction may lean heavily on experience charts, almost or entirely to the exclusion of commercial materials. A little later it employs basal readers when they appear to correspond with the requirements of small groups within a class, but at all times textbooks are supplemented generously by trade books selected for the individual child to fit his reading level and interests.

Speed Reading. Unlike the foregoing issues, the question of "speed reading" relates only to those who have already learned the basic skills. Most people, it has been found, learn to read at rates

which are comfortable rather than optimal. Hence a substantial increase in speed, say from 250 to 400 or even 500 words per minute is accomplished quite easily by the average person, given the desire, a few techniques, and practice. Moreover, such gains are in no way dependent upon gadgetry, and the basic principles can be incorporated in existing developmental programs in the upper elementary grades as well as at the later school and adult levels. Recently a few commercial reading "institutes" have cited testimonials of people reading from 2,000 to 15,000 words per minute. These claims have not been supported by suitable evidence. (1; 24) A break-through of the magnitude claimed would obviously have tremendous significance and is much to be desired, but it remains as yet in the realm of the imagination.

Programed Reading Instruction. The interest in automating instruction through the use of teaching machines has produced an impressive amount of research, practically all of it during the past decade. (21) Few of these devices have been constructed for reading instruction *per se*, although one, the "Metron-o-scope," appeared as long as thirty years ago. This machine was designed to foster speed and proper phrasing in reading. It was the forerunner of various reading films and reading "accelerators" which are now employed rather widely in remedial programs.

But programed instructional materials are not dependent necessarily upon use with mechanical devices. The main characteristic of these materials is their organization in short, sequential, self-correcting units. Such materials are well-established instructional elements in various subject-matter fields, including reading; examples abound in many carefully prepared basal textbooks and especially in their accompanying work books.

The use of programed instructional material in reading, whether prepared for presentation in or out of machines, will doubtless continue and will probably be augmented in the future with more sophisticated models. (11; 19) However, even the most ardent admirers of teaching hardware usually concede that neither it nor any publisher's package is likely to result in complete automation of reading instruction. The live teacher is certain to endure. There is reason to hope that the new technology will enhance the teacher's efficiency; there is reason to doubt that it alone will usher in a brighter educational era.

Simplified Alphabets. In the lower case letters "i. t. a." we have learned to see the abbreviation for Initial Teaching Alphabet

—and the latest of many efforts to simplify the task of the beginning reader. Paradoxically the number of components in the new alphabet is greater than in standard English, 44 instead of 26, but the increased difficulty in this respect is presumably compensated by the much greater congruence between the letters and the sounds they represent. Incidentally, 24 of the 44 are conventional letters. There are 14 digraphs or familiar letters joined together to make sounds. The remaining eight are new shapes. Omitted are the letters Q and X because they do not have their own sound value.

The new alphabet is used only in the beginning stages of learning to read, and the transition later to the traditional alphabet is said to present no problems. In England, where the system was devised by Sir James Pitman, it has achieved governmental recognition and been acclaimed a remarkable success. (7) Several thousand children in the United States are learning to read with "i. t. a." Preliminary reports are enthusiastic, although objections to the system have been voiced: these are its extra cost in providing special books and other materials, and the learning complications which it introduces. Whether the overall merit of "i. t. a." consists, as has been argued, in its offer to the beginner of a more learnable code for deciphering the written language remains open to question.

What makes the system at first glance appear different from the usual alphabet—and more complex—are the 14 digraphs. On the other hand, the one factor in my judgment that results in significant simplification is the elimination of upper-case characters. I should not be surprised if this low-cost feature, and this feature alone, will prove to have enduring worth in the beginning reading programs of tomorrow.

Structural Linguistics. From the studies and investigations which make up the science of structural linguistics have come various refinements in our understanding of the morphemic elements (spelling-patterns) and phonemic elements in speech (such as stress and pitch) which contribute to its intelligibility and meaning. (10) Certain linguists who have ventured into the reading field believe that their insights concerning spoken English must be incorporated into, and indeed become the core of, reading instruction.

Publishers of readers have been quick both to claim that their texts already give expression to linguistic findings, as indeed they

do in varying degrees, and to promise, without evident awareness of the contradiction, that new readers in press will revolutionize the teaching of reading. Just how linguistic insights and principles are to be applied to the development of significantly better reading textbooks and infused into more effective reading lessons remains, as June Verbillion has warned, inchoate and hypothetical. (25)

In the meantime another demurrer can be mentioned. Central to the linguist's thesis is the notion that reading is simply the reproduction of speech from print or writing. This holds true for some important kinds of reading, notably dialog in literature, but it is quite irrelevant to other kinds of important reading such as science, where reading has to do essentially with the stimulation of thought. I am not saying that thought is absent in speech or dialog, but I am saying that the personal-affective components in speech patterns on which linguists concentrate are largely absent from others forms of written discourse. I believe that structural linguistics will make a modest contribution to the teaching of reading when its applications are delineated and tested, and then assimilated within a comprehensive reading program that gives proper weight to many vital elements.

Neurological Retraining. By "neurological retraining" I refer euphemistically to creeping and crawling. As all newspaper readers or other mass media consumers know, these activities are being prescribed in various clinics and schools to correct poor reading, speech disorders, and sundry other learning problems. If children do not read, the story goes, their difficulties are often traceable to inadequate development of the cerebral centers which coordinate motor and perceptual functions. This failure is the result of insufficient opportunity during infancy to creep and crawl. The deprivation creates a kind of neural atrophy. Happily and remarkably, the loss is usually reversible throughout the childhood years, although the younger, the subject the greater the hope for recovery.

In Chicago, a score of elementary and secondary schools have been scheduling daily periods of 15 to 30 minutes for creeping and crawling. In Philadelphia, the Chestnut Hill Reading Center, where the program originated, has become a Lourdes-type shrine to which thousands of desperate parents have thronged in search of a miracle. A director of the Center and principal exponent of the theory is Carl H. Delacato. His views appear in several sources, among them a 1963 book entitled *The Diagnosis and Treatment of*

Speech and Reading Problems. (5) The book has had adverse reviews. (23) Joseph Wepman, director for many years of the Speech and Language Clinic at the University of Chicago, and a recognized authority in the field, asserts that the book offers "no corroborating evidence" for the author's viewpoint of neurological development.

The postulation of a point-to-point correlation between structure and function has been found to be untenable in other scientific attempts; it is made no more tenable by the simple statement that it is true, as it appears in this book. His argument that function or exercise will produce neurological growth has had few adherents over the years.

This review would be incomplete if it did not point out that some of the writer's statements are based on accepted physiological, neurological and psychological data. To these he has added no additional confirming data that would permit scientific replication. Before psychologists, or others interested in the multiply handicapped, send all of the children under their care off to Philadelphia to learn to crawl again, some scientific validation of the rather out-sized claims made in this book need to be verified. It is this reviewer's opinion, for what it is worth, that neither the diagnosis nor the treatment of speech and reading disorders have been materially benefited by the book, the theory, or the practice. (26, p. 352).

Delacato's work is reminiscent of the neurological notions advanced by Samuel Orton (16) in 1937—speculations which have been rather generally discredited. (14)

Early Reading Instruction. In a society which encourages boys and girls to go steady at the age of twelve, it is not surprising to find pressures to begin reading at the age of five or earlier. Whether either practice is healthy or desirable remains the issue. Secondary questions relating to reading include the following: Under optimal circumstances how many and what kinds of children succeed in learning at age five? At age four? Three? Two? One? (A book has just been published entitled, *How to Teach Your Baby to Read*.) (6) What criterion should one use for gauging success? What is the effect on reading skills and habits at later ages? On thinking ability? On attitudes, values, and adjustment? What are "optimal circumstances" and, more generally, under what conditions is it feasible to undertake reading instruction in the early years? And basically, what is meant by maturation

and development? (2; 15) Definitive answers to these questions are needed from philosophy as well as psychology, but they are not available as yet.

Nevertheless, there is available a tremendous amount of relevant research which can provide a sound guide for parents and teachers. I find support for this belief in the closeness of views expressed by authorities who argue respectively for and against early reading instruction. For example, the *NEA Journal* last year carried a debate on the question between Dolores Durkin (8) and William Sheldon. (22) Durkin recommends that "reading should be taught to *some* five-year-olds in *some* kindergartens." She describes various exercises, games and other activities that give experience with letters, words, names, labels, etc. which can provide an opportunity to learn rudimentary reading skills. Children's achievements in such activities is the best index to their readiness for continued instruction. "Eventually," she states, "at least in most kindergartens, one or two or more children will show special interest and ability in reading." These should receive more regular help, but still of a rather informal nature. Only later would simple books be used. Such suggestions "carried out in combination with the rest of the kindergarten curriculum will result," she hopes, "in a more flexible and stimulating program in which children are neither frustrated nor bored, a program which extends the experiences and interests of preschool life and which has something for everybody but no set goals of achievement for anybody, including the kindergarten teacher." (8, p. 24) Arguing for the negative, Sheldon concedes that some children learn to read at early ages. But, he cautions:

The research that is available and the wise conclusions of those who have spent their lives in teaching young children seem to indicate that there is little or no justification for introducing formal reading instruction to children under six years.

On the question of the hygiene of vision alone, to say nothing of the effect of symbolic confusion, I would vote for a delay in initial reading instruction and for a reduction in the time spent in early reading on the part of even six-year-old children. I would be content, at best, to allow a four- or five-year-old to read only when he demanded a chance to learn.

For the young child, and particularly for those fives and sixes who are intellectually, emotionally, and socially immature, I believe the most profitable program would be one of broad unstructured experiences in language aimed at clarifying and building concepts, developing skills of listening and speaking, and promoting the creative use of language as they explore the world around them. (22, p. 22)

Perhaps Sheldon is a bit overprotective. Personally I would not insist that a child of four "demand" a book before it is presented. I think books should be available and used, with virtually all children, especially when they show some interest. The problem is one of providing the opportunity and meaningful, functional incentive while avoiding pressure or preoccupation with reading to the detriment of other values. Despite the *caveat* just expressed about Sheldon's views, his position, I submit, has much in common with that of Durkin, and a synthesis of these views would probably be quite acceptable to most teachers and parents.

Pre-school Language Programs. Compensatory education (basically and more accurately, pre-school language instruction) addresses itself not to poor reading primarily but rather to a general learning inhibition that is so often observed among the culturally deprived or the socially disadvantaged. This is a problem of the poor, like malnutrition, without any bearing on race or color or nationality. It is a problem, in Henry Patin's formulation, created by class status and complicated for some by the problem of caste. (17)

The problem has another common denominator that has been identified by the British sociologist Basil Bernstein (3) as a linguistic deficiency. He notes, as many others have done, the meager vocabulary of the culturally deprived, but his emphasis is on an even more critical impoverishment in syntax or structure. In Bernstein's terms, the underprivileged child has a "public language" but little or no "formal language". The crucial difference is explained by Henry Patin, as follows:

The public language is characterized by simple declaratory sentences and imperatives. It serves adequately to convey a simple item of information, to make a request, to indicate agreement or disagreement. It contains, however, few dependent clauses, few structural complexities, and it never calls attention to itself (as when we pun). All of these latter are characteristics of "formal language." The middle-class child learns both the public language and the formal language; the lower-class child is at home only with the public language. The language of the school is, of course, necessarily the formal language; this is the language in which questions of why and how can be raised and answered; it is the language in which relationships previously recognized can be implicitly involved in subsequent discourse.

This linguistic theory differs basically from the Reissman "learning style" theory in that according to the former it is not simply a question of the school's making an adjustments in terms of the child's

avored learning approach. The deeper implications of the linguistic theory is that the culturally deprived child has suffered a basic inhibition of his intellectual faculties. One phenomenon which we would expect to observe if the theory is correct is that in those schools which have most diligently sought to maintain scholastic standards in a culturally deprived population, skill in arithmetic computation (which is commonly taught as pure rote) should be up to grade level, but skill in arithmetic problem-solving, like skill in reading, should be down. This is indeed a fairly common situation. (17, p. 307)

A further implication is that the widely hailed school-community programs in several cities, such as the Greater Horizons project in New York and variations in St. Louis, Detroit, Chicago, Washington, etc., useful though they are, have a limited potential. Similarly, activity-centered modifications of the elementary curriculum are worthwhile although their impact is relatively small. Both types of effort simply start too late to undo much of the damage.

The loss of intellectual ability occurs in the early formative years. To reverse the process of experiential understimulation and linguistic undernourishment, it seems essential to provide schools—nursery schools—that compensate at an early age for the deficiencies of the home. These schools should not teach reading; they should be equipped, programed, and staffed to foster adequate linguistic development and a zest for learning.

Conclusions

It would be easy to conclude from this hasty and incomplete review that more adequate research is required on virtually every issue I have mentioned. But the conviction that emerges after this survey, for me at least, is that substantial improvements in reading instruction and educational programs generally need not wait upon this research, or for final answers as to the differential value of various competing methodologies.

What seems most important at present is the need for more generous support to many established and experimental programs in education. Particularly would this seem to hold for such *new* ventures as public school nursery education and for such *old* recommendations as smaller classes, better educated teachers, higher salaries, improved working conditions, and an expansion of the manpower and brainpower for doing educational justice to all our

people. The cost would run to billions. To those who consider the expenditure a gamble we may reply that it is perhaps less of a gamble than our explorations in space. The full development of our human resources, at whatever cost, may well be our wisest investment.

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Progress Toward Adult Literacy

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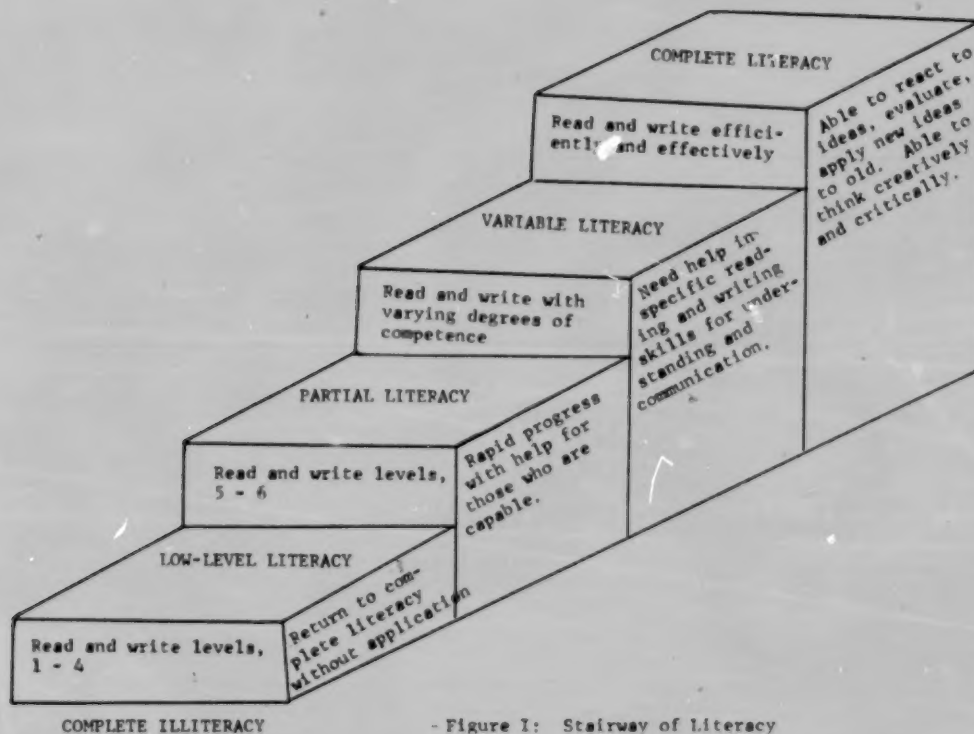
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Progress toward adult literacy in the U. S. has been pathetically slow and spasmodic. There have been spurts of activity each time automation has threatened groups of workers, but each endeavor has been rather short lived. Today we are faced with the need for training and retraining millions of adults who cannot contribute to this society unless they also become literate. This endeavor must be sustained—for the worlds of work, family living, and play become more and more enmeshed in a literate existence.

The task on hand is a monumental one, for we have permitted our society to maintain a fairly constant number of functional illiterates—about eleven million considering adults 18 years and over or well over eight million considering adults 25 years and over. And these figures are based on years of schooling rather than on measured achievement. Brooks (1) conducted a study in 1962 with a group of unemployed adults in Chicago. He administered standardized reading achievement tests to the group and found that the average reading level of these adults was almost three years below the average years of schooling. Seven per cent of the group appeared to be functionally illiterate when years of schooling were considered (based on reaching at least 6th grade); fifty-one per cent were functionally illiterate according to the reading tests results.

Definition of Literacy

Figure I, fashioned as a stairway of literacy, attempts to define the lowest step. Complete illiteracy means, of course, inability to read and write in English. There are two major types of such illiterates—those literate in a language other than English and those literate in no language. Our greatest need today is to help the tremendous number of individuals who are literate in no language. Step two, low-level literacy, briefly describes the individual who is barely able to contend with adult reading material. If he receives training and then does little practice or puts reading to little use, he is in danger of returning to step one, complete illiteracy. Step three, partial literacy, is the writer's term for what is often called *functional literacy*. Usually this has been considered



- Figure 1: Stairway of Literacy

fifth or sixth grade level, although the United States Government now considers eight years of schooling essential for functional literacy in this complex age. Note, however, that this stairway concerns itself with ability to read and write, not numbers of years of schooling.

Step four of Figure I, variable literacy, is probably applicable to many of us. This is that level at which we are able to read and write well, in some instances and in some areas, but not in others. Guidance in specific weak areas may indeed help the variable literate toward the goal of step five, complete literacy. This step is, of course, the ultimate—the ability to read effectively, suiting approach to purposes and difficulty of material. In addition to critical and creative thinking applied to reading and writing, we can, to this step, add Francis S. Chase's concept of the higher literacy:

1. The ability to read—and to listen and observe—reflectively, that is, to carry on a dialogue through which what is read is probed for its relevance to the events of the day and used to sharpen perception of the world about us and the peoples who inhabit it;
2. The power to comprehend the mathematical and scientific concepts and modes of inquiry which are reshaping the modern world;
3. The capacity to enter understandingly and appreciatively into values, modes of behavior, and points of view arising in cultures different from our own;
4. A willingness to consider ideas even when they seem threatening to cherished beliefs or vested interests;
5. A disposition to carry on steadily, through reading and other channels, inquiries directed toward the extension of knowledge and the cultivation of understanding. (2)

Program Efforts

Adult education has not been inactive over the years; there have been a number of programs focused on literacy training. Most of the efforts have been directed to the foreign-born but, here and there, there has been some attention paid to the native-born illiterate. In 1930 William S. Gray prepared a *Manual for Teachers of Adult Illiterates* for the Sub-Committee on Techniques of the National Advisory Committee on Illiteracy. This was followed soon after with a revision called a *Manual for Teachers of Adult Elementary Students* published by the American Association for Adult Education in cooperation with the United States Office of Edu-

cation. Both manuals were directed toward both the foreign-born and the native-born. Although there was a paucity of materials in the late 1920's and early 1930's, as there is today, literacy training was underway as a result of finding out that about twenty-five per cent of the drafted men during World War I had to be classified as illiterate. At that time there were about twelve million men and women who were not functionally literate.

The time in between major conflicts has not been used effectively or productively to reduce illiteracy in our country. When World War II came along and we still found ourselves with millions of illiterates, we then had an upsurge of training with a great deal of it accomplished in the Armed Forces. Now with the complexities of an advanced age upon us, we cannot afford upsurges and downsurges. The action needs to be constant.

In 1962, the Manpower Development Act was passed by Congress. This act provided means for retraining workers whose jobs had become or were becoming obsolete. As the retraining programs began, it was soon obvious that these workers needed training in reading and writing in order to contend with the job opportunities available. Hence, the Economic Opportunity Act of 1964 was passed by Congress. This is commonly called the Anti-Poverty Bill which is very educationally-oriented and provides for training camps, training centers, literacy classes, etc.

The stage is then set for a major effort directed toward reducing illiteracy in this country. The problems involved in a wide-scale instructional program are both diverse and overwhelming. To motivate large groups of adults for such instruction and to be sure that their objectives can be met is indeed a challenge. The ill-trained teachers and the poor and sparse materials available present many hurdles. Undoubtedly the job is not an easy one and no one person seems to know the answer. This writer undertakes to make a few suggestions which do not provide answers, but may suggest some possible directions.

Program Suggestions

1. *Seek a common definition of reading useful to literacy training.* There is too much emphasis in present programs on mechanics; the goal of many present programs seems to be mastery of sounds rather than communication. As Edgar Dale said not too long ago "... the way we define reading will determine how we teach it ..." (9, p. 1)

Adults who come to literacy classes for help are concerned with understanding the printed words and being able to use them for communication. They are (certainly in the beginning stages of instruction) not concerned with the long-range goal of learning the sounds to help with future reading; they want to read now. Granted some work in word attack may be essential and may be very necessary for them in order to help them to become independent readers, but this can come after initial successes with essential communication.

2. *De-emphasis attention to enunciation and pronunciation of words.* If the adults are coming to literacy class to be given help in reading and writing, concentration should be on that performance. Because someone pronounces a word in a different manner than someone else does not mean that he does not understand the word. We need to pay less attention to oral language exercises and correction, and put more time on actual reading and writing instruction.

The Diebold Literacy Project (4) has applied the principles of programing instruction to the teaching of reading to Negro adult illiterates in the Mississippi Delta region. Their material is programed for both teacher-helper and student. The teacher-helper is someone from the same area who speaks the same dialect. Both the information for the student and the information for the teacher-helper are programed, and the emphasis is on word recognition and comprehension rather than on developing pronunciations equivalent to that of the middle-class strata.

3. *Prepare teachers for the job.* Elementary school teachers who may be fairly well trained and experienced still have much to learn about how to teach adults, especially illiterate adults. The same, of course, is true of many volunteer workers who are being put into teaching situations with very little and very informal training.

Since teaching needs to take place now, naturally it is impossible to have training periods of great duration prior to the teaching situation. But in evening classes, for instance, the teachers who are doing the teaching should be paid for the teaching plus for an additional hour of in-service work every single session until they reach a level of competence which appears reasonable when evaluated by experts in adult education and in reading instruction. Teachers who teach classes during the day should have a certain

period of time set aside for compulsory training. There should also be training programs (and there are now a few in operation) of ten weeks duration or more, five days a week, where teachers-in-training are reimbursed for their time and are specifically trained (1) to work with adults and (2) to teach reading and writing. Universities, colleges, and school systems have an obligation to give some help in this area—facilities and teacher training.

4. *Develop and use materials that will enhance the students' self-images and make contributions to meaningful learning.* At this point, the materials are scarce indeed. We cannot use children's materials which are removed from need and damaging to ego. Adults must be faced with realistic and meaningful situations. They must have materials that will make a contribution to their ability to communicate in the world in which they live. True, as they proceed to the stage of some independent reading, they will want other kinds of material for enjoyment and recreation, but in the beginning stages, they must have materials related to their needs, their problems, their expectations.

News for You, (7) a weekly newspaper, which comes in three levels and is produced for adults, begins to satisfy some of the reading needs and also presents some opportunity for writing. It is imperfect but it is certainly a start in the right direction. The same may be said of another newspaper (9) directed more toward city school children, but nevertheless mature and readable enough for adults. This is issued monthly and also presents some exercises for answering questions in written form. We need more in the way of newspapers and current materials that do not overwhelm in terms of pure bulk. We should have a magazine for adults in literacy programs.

We also need to develop realistic bibliographies that contain materials for adult reading. The Laubach Literacy Fund (6) has developed a bibliography that contains a number of useful references. Another was developed at the University of Chicago (8) for the introductory stage of adult literacy education. The American Library Association indicates that possibly by next May, they will have a fairly comprehensive bibliography available.

In addition to printed materials, there needs to be a great deal of emphasis on the experience approach. This emphasis is essential since the adults in literacy classes will have some very individual needs and also some common needs related to their environments.

Words that represent the listening and speaking experiences of these adults make excellent reading and writing materials, for they so often represent the concepts the adults wish to use for communication in reading and writing. For instance, one adolescent who was able to get to the point where he could write fairly well used the words that he was learning to express himself in this way:

I feel that if a person can't feel happy at home or can't find any love or understanding with his father and mother that this is where hate begins to form toward the world. When one has to live a hard and unhappy life as a child then it will be very hard for him to really respect others if he has lost this respect a long time ago as a child.

This is excellent material for the extension of learning-language experiences. We might also wish to concentrate on the learning of sight words that extend beyond the Dolch basic words. For instance, Wilson's vocabulary words (10, p. 94) which deal with such ideas as *No Trespassing*, *Bridge Out*, *Men*, represent words that the learner will be meeting and will need to understand.

5. *Try new approaches to teaching reading and writing.* Systems that fuse the learning modalities probably have more promise than those which move along one mode. The Diebold Corporation, with its programed instruction and its listening, speaking, seeing approach, needs more exploration. Educational Developmental Laboratories' new auditory-visual approach using an instrument called the Audex may make an important contribution.

Mixtures of traditional approaches need to be tried in order to see which seems to work best for the largest number. For instance, in the past, most of the instruction in literacy classes has been either large group or tutorial, combinations of these two approaches encompassing team teaching need a great deal of exploration.

6. *Try large, bold, new organizational plans.* But be sure that they are part of a research design which will insure replication. Example: perhaps Dan Levine's (7) contention is valid—that we should remove coeducation and group by sex. He suggests this for the culturally disadvantaged child, but certainly it has possibilities for the culturally disadvantaged male who comes from a matriarchal society and may be unable to function well in the coeducational learning situation.

There are many groups sincerely interested in raising the level of literacy in the U. S. There is a national committee for Adult Literacy; the International Reading Association, the National Council of Teachers of English, the American Library Association, and other agencies have either committees or are making efforts in the area of adolescent and adult literacy. They all realize the needs presented in this paper.

The biggest problems seem to be avoiding needless duplication of effort and getting some agency to take responsibility for coordinating activities. Perhaps the National Reading Conference, so long concerned with college reading but limited in its approach to adult reading, might now make the area of literacy instruction a major focus. Perhaps this organization can find a way of coordinating the efforts of the many interested agencies, so that we may truly begin to help our fellowman climb the stairway of literacy.

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Changing Patterns of Factors in Power of Reading, Elementary Through College Levels¹

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The purpose of this paper is to (a) integrate the substrata factor patterns underlying power of reading at the elementary (Singer, (24, 26), high school (Holmes and Singer, 13), and college levels (Holmes, 9) and (b) relate these changing patterns in reading to the development of general intelligence. The first part of the paper is a summary of the substrata factor theory of reading, from which hypotheses were deduced and tested in each of the reading investigations. The second part is a report of my current research in reading and an explanation of the resulting theoretical model of the development of Power of Reading in grades 3 through 6. The results at the elementary level will then be integrated with those at the high school and college levels. In the last part of the paper I will point out relationships between these findings on development of power of reading and some research on development of intelligence.

Substrata-Factor Theory of Reading

The substrata-factor theory of reading is an explanation of the mental structure and dynamics involved in reading (Holmes, 8, 9, 10; Singer, 22; Holmes and Singer, 13). The theory asserts that as an individual learns to read, he sequentially develops a mental structure that is complexly interwoven and functionally organized in at least three hierarchical levels. Each level contains information stored in cell assemblies, which has been acquired from instruction and learning in such broadly defined areas as word recognition, word meaning, and reasoning-in-context (Singer, 23). As a result of maturation, instruction, and practice in reading, these cell assemblies are organized into substrata-factors or neurological subsystems which may be categorized as interrelated input (sensation and perception of stimuli), mediational (interpreting, inferring, and integrating ideas), and output (response formulation) systems. These systems, coupled by short and long term memory processes,

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are then available for mobilization into a working system for attaining speed and/or power of reading according to the purposes of the reader and the demands of the reading task (Holmes and Singer, 14). The operation of each working system is influenced by the individual's attitudes, emotions, values, and biological support systems (Davis, 3).

The mobilization process selects the components of the subsystems and orders them into a functional neural communication network or working system of different substrata levels for solving a particular reading task. At one moment the reader may organize a working system to recognize a word, at another instant to associate meaning to the word, and at still another time to integrate, transform, or to encode ideas for an overt response. Hence, working systems are constantly being organized and reorganized according to the reader's changing purposes and the shifting demands of the perceived task.

But, in the initial stages of learning to read, an individual's attempts to mobilize his developing subsystems into a working system for responding to the printed page are characterized by hesitancy, rigidity, and frequent lack of success because he does not yet have adequately developed subsystems nor the necessary mental structures and flexibility for changing appropriately from one working system to another (Inhelder and Piaget, 17; Laycock, 21). Gradually, however, his subsystems improve in variety, magnitude, and intercommunicability because of maturation, learning, and experience in mobilizing subsystems into a multitude of working systems; consequently, he becomes more capable of shifting from one mental organization to another. Also, the individual becomes better able to mobilize conceptual systems that are appropriate for responding to various stimulus categories and for selecting and organizing word meanings applicable to the context because of his growing capability to conceptualize stimuli in his input and mediational processing systems (Singer, 22; Bruner and Oliver, 2).

With continued development, instruction, and practice in reading progressively more challenging material, the individual forms his subsystems into a hierarchical organization of word-recognition, word-meaning, and reasoning-in-context substrata (Singer, 23). When the necessary subsystems have been developed and can be mobilized in proper order and magnitude, the individual attains

working systems for speed and power of reading that function fluently and harmoniously. However, increased speed and power of reading are not only related to changes in magnitude and variety of available substrata-factors but also to their integration and consequent interfacilitation. At reading maturity, therefore, an individual is able to mobilize rapidly and flexibly a hierarchical organization of subsystems in which a minimum of mental energy is devoted to the input system and a maximum is expended upon mediational and output systems.

Many kinds of working systems or conceptual strategies for attaining speed and power of reading result from individual differences in (a) rate of maturation and degree of capacities, (b) method, sequence, and degree of learning, (c) background experiences and range of resulting ideas, and (d) temperament and motivation, as well as values. These differences are manifested in the kinds and relative amounts of subskills which each individual mobilizes into a working system to solve a particular task. Hence, the degree of achievement attained and the processes underlying the solution of a task may vary from person to person, not only because of quantitative differences in substrata factors but also because of qualitative differences in organization of working systems. However, there is more than one route to successful reading; that is, two individuals may attain the same level of achievement but by means of different working systems.

In essence, the substrata-factor theory of reading is an explanation of the development and dynamic functioning of an intellect that is increasingly able to transform symbolic stimuli into meaningful mental processes, and then purposefully interrelate these processes by various mediational systems in order to efficiently and effectively comprehend and react to the thoughts of another person as expressed in his writing.

Problem

The following hypothesis, drawn from the substrata factor theory of reading, was tested at the elementary school level: As an individual, in general, learns to read he sequentially develops a mental structure of complexly interwoven subsystems which he can mobilize or functionally organize into various working systems according to his purposes and the demands of the task. However, at least at the high school level, if the individual is to read at all,

he must call upon certain necessary subsystems, whether these subsystems are strengths or weaknesses in his substrata factor repertoire (Holmes and Singer, 13, 15). This finding suggests the hypothesis that there is a necessary, developmental working system for attaining speed and power of reading around which individuals vary according to their unique pattern of strengths and weaknesses. Furthermore, developmental improvements in speed and power of reading would seem, in some degree, to be related to (a) quantitative and qualitative developments in the substrata elements and substrata factors which make up these systems and (b) the interfacilitation resulting from the integration of these factors and from their subsequent organization into a hierarchical structure. Therefore, the purposes of this study was to test the following developmental hypothesis: As an individual, in general, improves in reading ability his underlying substrata elements and substrata factors have concomitant changes in magnitude and/or organizational position in his mental structure for attaining speed and power of reading. Hence, the specific problem was to discover (a) what elements and substrata factors change and in what degree and (b) whether the general working system undergoes a reorganization in substrata-factors mobilized for reading ability in grades 3 through 6.

A previous report (Singer, 25) confirmed the first part of the hypothesis: For the average reader, all the substrata elements improve in more or less quantitatively uniform increments concomitantly with development of speed and power of reading in grades 3 through 6. Consequently, the present study will be concerned primarily with the remainder of the hypothesis, specifically with identifying the factors which account for individual differences in speed and power of reading at each grade level and with changes in the organization of these factors as individuals improve in speed and power of reading in grades 3 to 6.

The problem may be restated in terms that are more meaningful to the classroom teacher. The average scores of a class of pupils in speed and power of reading typically increase each year when measured on such a test battery as the *Gates Reading Survey*. Pupils within these grades, however, vary widely not only in speed and power of reading, but also in a multitude of subabilities, such as phonics, knowledge of affixes, vocabulary, interpretation of para-

In this study, *Speed of Reading* was assessed at all grade levels by a seven minute subtest of the *Gates Reading Survey* (5). *Power of Reading* was measured by the *Level of Comprehension* subtest of the *Gates Reading Survey* (6).

graphs, and many other skills which teachers emphasize in the belief that development of these skills will effect an improvement in general reading ability. Although teachers know what and when they teach a particular subskill, they do not know what factors pupils may be learning, integrating, and mobilizing for attaining improvement in speed and power of reading. In other words, teachers need to know the particular constellation of factors which, in fact, do account for variability in speed and power of reading at each grade level. Also, they need to know the specific quantitative, qualitative, and organizational changes that occur in the constellation of factors associated with the development of speed and power of reading. Consequently, this study was designed to give teachers and curriculum makers a better understanding of reading development and provide them with a statistically-determined model to use as a guide in planning instruction for improving speed and power of reading in grades 3 through 6.

Experimental Design

The developmental hypothesis was tested by means of a selected battery of scales which had precipitated as predictors in previous investigations at the college (Holmes, 9), high school (Holmes and Singer, 13), or elementary level (Singer, 23). These tests encompassed measures of mental abilities, listening comprehension, linguistic meaning, word recognition, and visual and auditory perception.¹ Personality, interest, and motivation variables were not included because factors representing these domains either had not precipitated from the substrata analysis in previous studies or tests from these domains were not psychometrically suitable for administration at the elementary school level.

The scales were administered to samples of about 250 pupils each in grades 3 through 6.^{2,3} From comparison of the means of the sample data with standardized test norms on age, I.Q., Speed and Power of Reading, the sample appears to be representative of the general population. Moreover, the cumulative records of the

¹Tests were selected from the following batteries: Durrell and Sullivan (4), Gates (5; 6), Holmes (11), Kwalwasser and Dykema (19), Singer (24), Thurstone and Thurstone (28), and Van Wagenen (29).

²In Grades 3, 4, 5, and 6, there were 122, 128, 149, and 76 boys and 101, 155, 122, and 83 girls, respectively.

³The writer wishes to express his appreciation to the Alvoird Unified School District, to the Riverside County Superintendent of Schools Office, and to his research staff at the University of California, Riverside for participating and cooperating in this research project.

subjects revealed that they had been taught by a wide variety of teachers, used a heterogeneous set of basal and supplementary readers, and had been registered in many school systems throughout the country. Therefore, the results of the investigation cannot be related to any particular set of materials nor to any particular methodological emphasis.

Preliminary analysis of the data revealed that all the tests have substantially high reliabilities. Bivariate distributions of each variable with Speed and Power of Reading, respectively, satisfactorily passed the chi-square test for rectilinear regression.¹

Analysis of the Data

Substrata analysis (Holmes, 7; Holmes and Singer, 13), an extension and modification of the Wherry-Doolittle Multiple Selection Technique (Wherry, 30), was used to analyze the data.² Essentially the Wherry-Doolittle is a multiple correlation technique in which a minimum number of first level predictors are selected from a correlation matrix that tend to yield the maximum prediction of a criterion, which in this study was Speed or Power of Reading. The technique is extended to identify lower levels of the hierarchy by next eliminating the major criterion variable and then utilizing each of the first level predictors as a subcriterion and finding which of the remaining variables in the correlation matrix are substrata factors for each subcriterion. The substrata analysis was thus carried out to several levels to obtain a best estimate of the pattern of abilities underlying Speed and Power of Reading for the *average* individual. The first level predictors from each grade were then utilized in the construction of the models in order to emphasize the developmental scope and sequence of substrata factors that accompany improvement in Speed and Power of Reading for the average reader. However, this interim report will present only the model for Power of Reading and attempt to integrate it with models for Power of Reading at the high school and college levels.^{3,4}

¹Computations were performed on the IBM 7090 Computer at the University of California, Berkeley by means of RSCAT program written by M. Maruyama.

²Price Stiffler modified the substrata analysis program for the IBM 7090 Computer at the University of California, Berkeley, and assisted in all statistical analyses for this investigation.

³A paper on the model for Speed of Reading was read at the Annual Convention of the National Council of Teachers of English, Cleveland, November 27, 1964.

⁴A final report to the U. S. Office of Education will be made on the complete project (Singer, 1965).

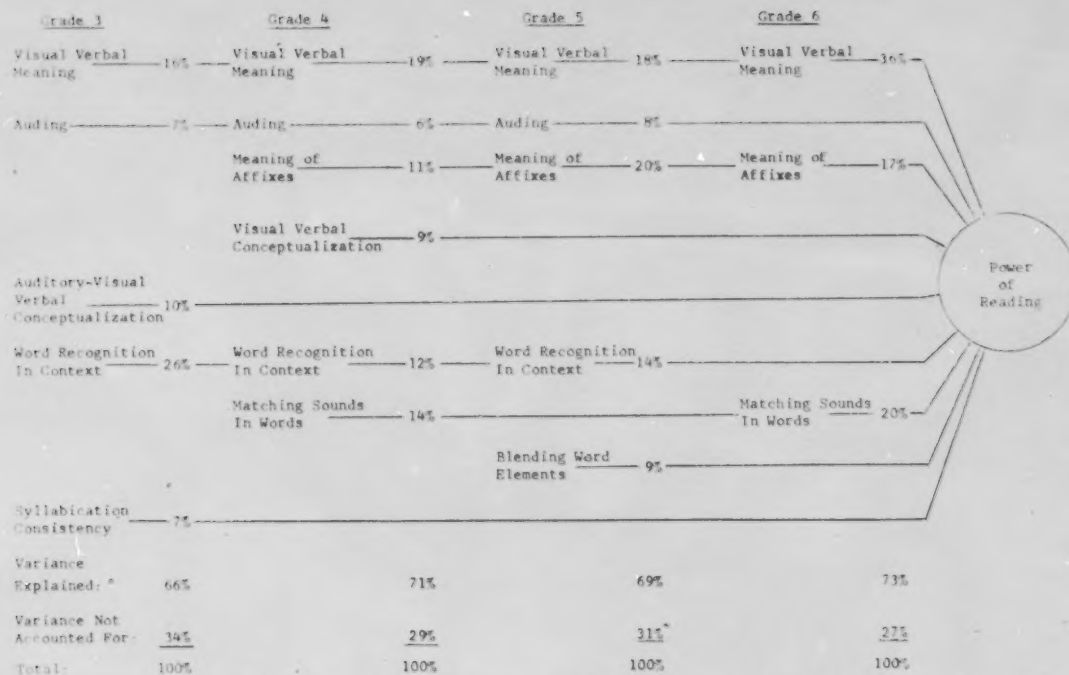


Fig. 1. Diagrammatic Model of the Substrata-Factors Accompanying Development of Power of Reading in Grades 3 to 6. The model shows for each grade the first level substrata factors and their per cent contributions to variance in Power of Reading. The variance *not* accounted for is probably attributable to Attitudinal Factors, Verbal Flexibility, and Mobilizers. Harry Singer, 1964.

Results

The diagrammatic model for development of Power of Reading in grades 3 through 6 is shown in Figure 1. The model reveals (a) the factors which accounted for variance in Power of Reading at each grade level and (b) the developmental changes in substrata factors that accompany improvement in Power of Reading from grades 3 to 6. In the left hand column of each figure are the substrata factors or predictors for grade 3, followed in successive columns by the predictors for grades 4, 5, and 6. Adjacent to each predictor is its per cent contribution to the variance in Power of Reading for the particular grade level. At the bottom of each column is the variance in Power of Reading that was not accounted for, which must be attributable to variables other than those used in the construction of the model, such as mobilizers (Holmes, 10), and flexibility (Laycock, 20; 21).

Developmental Model for Power of Reading. Figure 1 reveals that at the third grade level, five factors accounted for 66 per cent of the variance in Power of Reading. Two word recognition factors contributed half of the predicted variance: Word Recognition in Context, the use of context to infer a missing word, accounted for 26%, and Syllabication Consistency, the application of syllabication rules to the division of words, accounted for another 7%. The remaining half of the predicted variance is distributed among the following three factors: Visual Verbal Meaning, 16%; Auding, 7%; and Audio-Visual Verbal Conceptualization, 10%. These factors consist of knowledge of word meaning, listening comprehension for words and stories, and the formation and use of concepts, respectively. Thus, at the third grade level, half of the predicted variance in Power of Reading is attributable to word recognition abilities or factors involved in transforming visual verbal stimuli into meaningful mental processes; the other half is accounted for by association of meaning through the auditory of visual modality and the organization of these word meanings into ideas.

At the fourth grade level, the following quantitative changes have occurred in the substrata factors: Word Recognition in Context has declined to only 12% in contribution to variance in Power of Reading. Visual Verbal Meaning, however, has increased to 19% and Meaning of Affixes has emerged with 11% contribution to variance. But, Auding is approximately the same at 6%. Two other factors also precipitated from the analysis: Matching Sounds

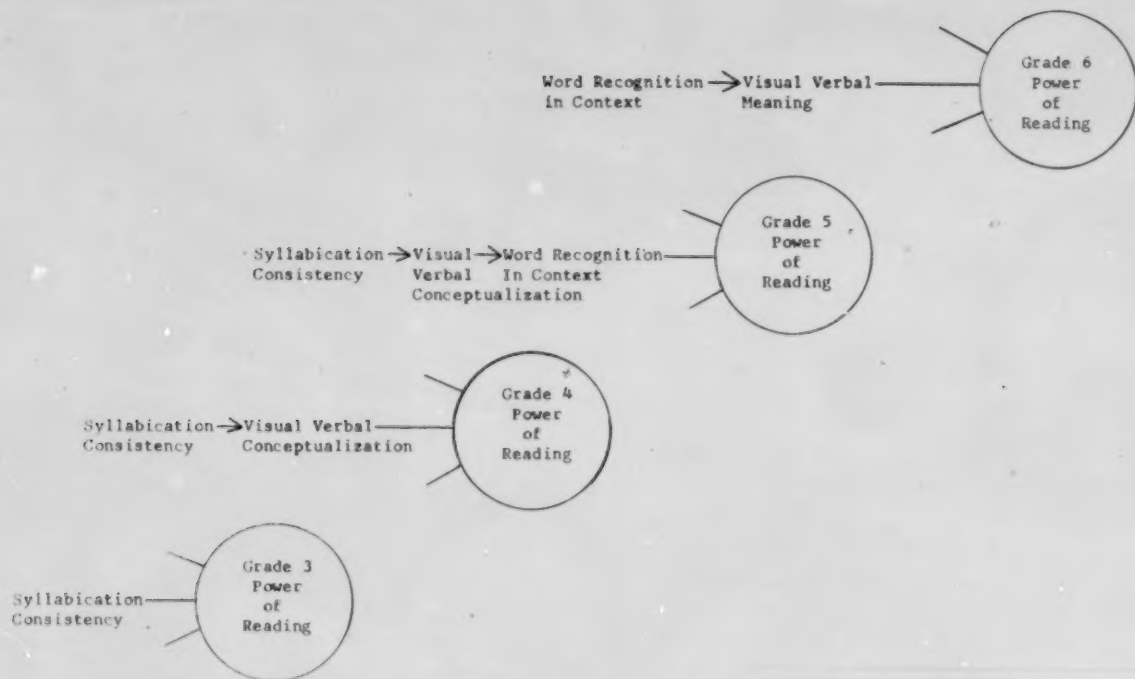


Fig. 2 A Developmental Integration of One Subsystem for Power of Reading in Grades 3 through 6. The figure shows that Syllabication Consistency makes a *direct* contribution to variance in Power of Reading in Grade 3 but an *indirect* contribution through other factors at Grade 4, 5, and 6. Harry Singer, 1964.

in Words, the ability to recognize homonyms or whole word sounds, accounts for 14% and Visual Verbal Conceptualization, the ability to conceptualize printed words, contributes another 9% to the variance in Power of Reading. Thus, at the fourth grade level, variation in Power of Reading is more attributable to word meaning than to word recognition factors.

The trend discernible in the fourth grade continues at the fifth grade with another quantitative decrease in word recognition factors (Word Recognition in Context, 14% and Blending Word Elements, 9%) and another increment in word meaning factors (Visual Verbal Meaning, 18%, Auding, 8% and Meaning of Affixes, 20%).

Only three factors accounted for 73 per cent of the variance in Power of Reading at the sixth grade level: Visual Verbal Meaning, 36%, Meaning of Affixes, 17%, and Matching Sounds in Words, 20%. Again, word meaning and ability to reason out word meanings that are not directly known through the visual or auditory modalities account for more variance in Power of Reading than they did at previous grade levels. Success in intra-group competition in Power of Reading at the sixth grade level, therefore, depends upon skillfully transforming stimuli through the visual or auditory modalities into mental processes which can then be associated with meaning, either directly or through an analytical and synthesizing mediational system.

Trends in the Developmental Model for Power of Reading.

The following trends can be gleaned or inferred from the developmental model for Power of Reading: (1) A combination of context clues and auditory word recognition processes are gradually integrated with other substrata factors and mobilized throughout the development of the working system for attaining Power of Reading. (2) Both auding and visual verbal meaning systems are mobilized for attaining Power of Reading, but auding becomes subordinately integrated with the visual verbal system after the fifth grade. (3) Individual differences at successively higher grade levels in Power of Reading are less attributable to word recognition processes and more associated with word meaning analysis and knowledge of word meanings and the concepts they represent. (4) A sequential integration of substrata-factors can be inferred from the model and was empirically demonstrated by substrata analysis at the second and third substrata levels (Singer, 26). For example, as shown in Figure 2, Syllabication Consistency accounts

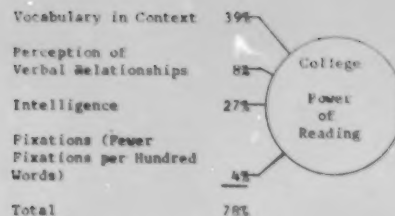
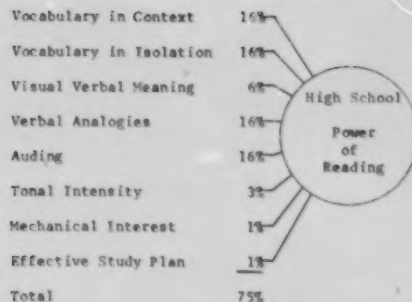
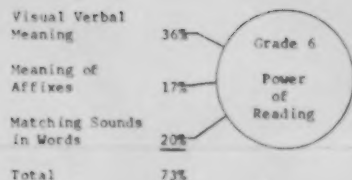


Fig. 3 First Level Substrata Factors and Their Per Cent Contributions to Variance in Power of Reading at the Sixth Grade, High School, and College Levels. Harry Singer, 1964.

directly for some of the variance in Power of Reading at the third grade level. At the fourth grade level it contributes through Visual Verbal Conceptualization to variance in Power of Reading. At the fifth grade level, Visual Verbal Conceptualization accounts for some of the variance in Word Recognition in Context, which makes a direct contribution to variance in Power of Reading. Finally, at the sixth grade level, Word Recognition in Context contributes through Visual Verbal Meaning to variance in Power of Reading.

Elementary, High School, and College Substrata-Factor Patterns. A comparison of first level substrata factors from the sixth grade of the above study and from previous investigations at the high school (Holmes and Singer, 13) and college levels (Holmes, 9), as shown in Figure 3, can at best only suggest hypotheses for a longitudinal investigation, since neither the test batteries nor the subjects in these grades were identical.¹ With this necessary qualification in mind, Figure 3 reveals the following similarities and differences in substrata-factor patterns from grade 6 through the college level:

1. Although some variance in Power of Reading may be distributed over several vocabulary measures as shown in the substrata-factors at the high school level, the fact that the total variance attributed to vocabulary abilities increases significantly after the fifth grade and then remains approximately the same from the sixth grade through the college level suggests that the vocabulary domain has consequently attained a stage of development at the sixth grade that quantitatively approximates its contribution to variance in mature organization for Power of Reading.

2. Auding was included in the test batteries at all except the college levels. However, Auding did not precipitate at the sixth grade, but does so at the lower grades and again at the high school level. This discrepancy may be partly due to differences in the response systems² of the two auding measures and partly to developmental changes in mental organization for reading. At the elementary level, the auding test consists of listening comprehension with responses to printed pictures and consequently seems to tap auditory-visual factors at a concrete or associational level (Singer, 27); at the high school level, the auding test measures listening comprehension with responses to verbally stated multiple choices. Therefore, the resulting hypothesis from these observations is that reading remains an "audiovisual verbal processing skill of symbolic reasoning" (Holmes and Singer, 13), but the auding contribution to variance shifts at the sixth grade to auding ability at a more abstract level of organization.

If factor analytic data at these school levels had been based upon identical tests or subjects, then Kaiser and Bianchini's (18) program for relating factors could have been utilized for a quantitative comparison of the results.

3. Meaning of Affixes and Matching Sounds in Words precipitated as first level substrata factors only at the sixth grade, even though measures for these factors were in the matrices at each school level. These factors become subordinately integrated with other factors at the higher school levels. Knowledge of affixes becomes integrated with Auding at the high school level and Vocabulary in Context at the college level, while auditory processes become subordinated to auding and visual vocabulary factors at the higher levels.

To summarize: this comparison has suggested the following hypotheses: (1) subordinate integration within factors mobilized for Power of Reading continues throughout the grades; (2) at the sixth grade level, a stage characteristic of mature organization for Power of Reading has occurred in the vocabulary domain; (3) between elementary and high school levels, auding shifts from a concrete to a more abstract level of organization in contribution to variance in Power of Reading; and (4) the visual modality becomes dominant over the auditory in processing input stimuli.

Relationship Between Development of Intelligence and Power of Reading. The following explanations of the development of intelligence are consistent with the substrata-factor theory of reading and may help explain some developmental changes in factor patterns for attaining power of reading: (1) Bruner and Olver (2, p. 133) found that level of conceptualization in elementary school is an inverse function of the difficulty of the concept. For example, an individual could attain generalizability and economy in information processing by using the superordinating concept of "fruit" for integrating the relatively easy elements, "orange" and "banana." But, as elements increasingly more distant on a continuum from concrete to abstract were added until the elements finally exceeded the capability of an individual to integrate them by means of superordination, he would resort to a less mature type of organization, sometimes simply linking the elements of the concept into a story, much as a reader who could not answer a question on the central thought of a passage might reply by merely repeating what he had read. Bruner and Olver then theorized that in the growth of intelligence, strategies develop for encoding information in simpler form, connecting this encoded information with other information already encoded, and maximizing the possibility of combinatorial operations for grouping and regrouping information. In general, therefore, an older individual is less complex than a younger person in the sense that the older individual's information is more organized, interconnected, and capable of re-

organization. Likewise in the substrata-factor theory of reading, factors or subsystems of information are hierarchically organized and interrelated with other subsystems, which are mobilized into working systems according to the purposes of the reader and the demands of the task. When the task becomes increasingly difficult, the motivated individual may respond by mobilizing a more complex working system, consisting of some factors which had developed at an earlier stage, for example, an individual might resort to reading difficult material aloud, but for easier material he would use a more mature visual processing subsystem. (2) Piaget (Inhelder and Piaget, 17, and Inhelder 16) has categorized mental development as progressing through three emerging levels of organization which can be accelerated or delayed by environmental factors but is mostly biologically determined: (a) The sensorimotor stage consists of operations that require action on objects, but the action is not accompanied by simultaneous mental representation, (b) a concrete stage emerges about age 6 that is characterized by simultaneous mental representation, but in this stage the individual is not yet able to carry out more than one simultaneous operation, such as reversibility or conservation or transitivity, and (c) a stage of formal operations, beginning about age 12 and reaching a peak at age 15, at which the individual becomes capable of generating all hypothetical combinatorial possibilities in the solution of a problem. Passage from an "inferior" to a "superior" stage is equivalent to an integration in which the inferior serves as a base for the superior and becomes part of the superior. Piaget's theory of developmental stages may explain the changes in factor patterns that emerge about the sixth grade: the average sixth grader may be passing from a concrete to a more abstract, formal stages of development. Closely related to the developmental pattern of changes that accompany development of power of reading is the conclusion on the growth of intelligence reached by Bayley (1, p. 807) in her monumental longitudinal study: "Intelligence . . . appears to be a dynamic succession of developing functions with the more advanced and complex functions in the hierarchy depending on the prior maturing of earlier, simpler ones."

Although the structure of intelligence and power of reading have some degree of communality (Holmes, 12), the factors typically measured by intelligence and reading tests are not identical. In the working system mobilized for attaining power of reading some subsystems, such as word recognition, are tapped which

would not necessarily be mobilized for performance on an individual test of intelligence, even though conceptualization abilities may enter into the acquisition of the word recognition system (Singer, 22). Another way of stating the argument is simply to point out that although an individual may be bright, he still has to learn to read. This is tantamount to saying that he must acquire the necessary hierarchy of subsystems and learn to mobilize them into an integrated working system for attaining power of reading.

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The Promise of Paperbacks

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PUBLISHERS' WEEKLY recently re-printed an item from the *TEE-PEE*, bulletin of the Toledo Public Library system. Librarian Mary Wheat received a request for help from a woman who wanted either *LORD OF THE FLIES* or *THE BABE RUTH STORY* for her son, saying also, "They're both baseball stories, aren't they?" Miss Wheat commented that perhaps she should have suggested *THE CATCHER IN THE RYE*. Though humorous at first glance, it is significant to notice that the woman, ill-informed as she was, at least wanted books for her son. She had heard of the books she mentioned. It is interesting to wonder whether she would have noticed them if there had not been a paperback revolution that began in our country in about 1939.

Five years ago, in 1959, *PAPERBOUND BOOKS IN PRINT* listed but 6500 titles. The October issue of the same publication this year list 29,500 titles, an increase of over 450%. Two hundred and seventy seven publishers sold 300 million paperbacks in 1963. A random sample of four issues of *THE MONTH AHEAD* reveals 630 new titles for September, 500 titles for April, 400 titles for July, and 345 titles for December of this year. It is safe to say that there are now over 30,000 titles in paperback form at this time, and over one million paperbacks are sold during each business day.

When Karl Tauchnitz of Leipzig published the first paperbacks as we think of them in 1809, his wildest nightmares would not have envisioned what he started, in all probability. The nineteenth century saw the dime novels that were so popular with Civil War soldiers, ruthless literary piracy of the type that helped to starve Poe and other authors due to a lack of an international copyright agreement, and the sudden end to professional publishers' thievery when the agreement was signed in 1891. Though comic books were popular with soldiers in the first World War, much more interest was shown in cheap hard cover reprints in the first third of the twentieth century. The paperback revolution as we know it began with the formation of the Pocket Books Company in 1939.

Pocket Books sold more copies in its first ten years of existence than all the best-sellers combined since 1880, including book club selections, according to John Tebbel. Today, its sales have passed the billion copy mark.

It is natural that teachers of reading and educational institutions should become interested in this phenomenon, especially in its potential for stimulating and encouraging the reading habit at all stages of the educational process. The New York City Public School System recently conducted a study through its Bureau of Educational Research called **A STUDY OF CERTAIN FACTORS RELEVANT TO THE USE OF MASS MARKET PAPERBACKS IN HIGH SCHOOL LITERATURE CLASSES**. Two thousand five hundred students, 2000 parents, 85 department chairmen, and 45 teachers examined the paperback as an educational tool. Factors studied were students' attitudes toward such books, teachers' and department chairmen's opinions on the educational merits of such books, parents' reactions toward the issuance and use of such books in English classes, and durability under regular conditions of use. The books were examined, compared and contrasted with hard-cover textbooks.

Seventy-five per cent of the student respondents favored paperbacks over hard-cover texts. Seventy-five per cent of the English department chairmen also favored paperbacks over hard-cover texts. Sixty per cent of the parents were favorable to the use of paperbacks, and when all facets of teacher opinion were examined, there was more approval than disapproval about the use of paperbacks in English classes. In regard to durability, after one semester of use, 2% of the "quality paperbacks" were rated unfit for further use, while 34.4% of the mass-market paperbacks were rated as unfit for further use. Individual titles differed greatly in specific types of wear, in average ratings, and in suitability for further use. Among the recommendations of the committee of investigators were the following: (1) that literary works in paperback form be purchased with Board of Education funds at the discretion of the principal and the department head; (2) that the problem of paperback textbooks be approached from the viewpoint of educational merit rather than that of economy.

Other research studies are being conducted. An extensive study will soon be released by the New Jersey Department of Education, and I understand that another study is being conducted in Wash-

ington, D. C. There is obviously a need for much more research in this area.

In an informal study two years ago, I made available to my students a 350 volume classroom paperback library containing a wide variety of titles. I neither compelled nor motivated them to check books out of it. I mentioned that the books were available to them if they wished to check them out. One hundred seventeen students read an average of 3+ books during the school year. Seventy-five per cent to eighty per cent of them had a book from this library at any given time, and the range of ability encompassed poor, average, and superior readers. The students reacted enthusiastically to the availability of paperback books. The factors which influenced their feelings toward the library were the ease with which they could check out books, the absence of a rigid time limit, the probability of a popular book being accessible, the opportunity to discuss books with other classmates from day to day, an increasingly familiarity with the library's contents as they browsed through it frequently, and the appeal of books with attractive covers, lightness of weight and apparent brevity in comparison with hard-cover books. Last year, a similar pattern emerged, though I did direct students to the library at various times. One hundred and twenty four students read an average of 3.5+ books from the class library. Other competing sources were also available to them. They included a school paperback bookstore, a book fair (where 700 students bought 1406 books), the school library, class book clubs, class libraries in other subject area classes, and normal community outlets such as drugstores, book stores, the town library, and home libraries. This year, students continue to check out books from the library eagerly. I am sure that a more formal, rigorously controlled study would yield pertinent data, but I discovered for myself the answer to the major question that was in my mind: Does a classroom library of paperbacks serve to stimulate reading? Yes, I submit that it does, if it includes a wide range of books that appeal to the students who use it.

Teachers were also simulated. Requests from English teachers for similar classroom libraries were so numerous that the administration decided to allow each English teacher in the Middlesex and Mather Junior High Schools in Darien to form a paperback library. This year, science and social studies classes also have such libraries.

Students find the paperback appealing. If they did not, the Scholastic Book Clubs would not have a total of 8 million members in 200,000 individual club groups, ordering books for their personal libraries every month. One should note that 12% of the 300 million books sold in 1963 were sold to high schools.

Many teachers also find the paperback a flexible, attractive tool for their purposes. Literature anthologies always have had a tendency to impose themselves on course outlines and to shape curricula. Public domain titles, such as *SILAS MARNER*, *INVANHOE*, and *THE LAST OF THE MOHICANS* have been rammed down students' throats mainly because of publishing economy. Some students come away from these literary experiences thinking that *MIDDLEMARCH* is eight pages long, *WUTHERING HEIGHTS* a six-page short story, and *WAR AND PEACE* a twelve-page diversion by a Russian with a funny name. Viewed in their proper light, anthologies can be marvelous literary samplers, excellent springboards to the reading of whole works, but one wonders how often the unimaginative teacher trots from page to page, snippet to snippet, extolling the hapless Evangeline and her agonized meanderings that are described in what must be the sorriest poetry ever concocted by a prosaic poet, then moving backward to the turgid prose of Cooper, or forward to a brief, unsatisfying glimpse of Mark Twain. Whole works to be read in depth are what paperbacks offer to the teacher. A new world of flexibility and selectivity is now within the teacher's economic grasp. A trend toward units of paperbacks that serve as large anthologies of whole works is apparent, and several publishers are making packaged units built around themes, genres, or forms of literature available.

In secondary schools, thousands of students are never taught the important skills of underlining and marginal note-making because schools own the books and they must be used by students over a period of years. If students own the paperbacks they study, they can learn these skills and practice them. The economics of paperbacks makes such a scheme possible.

Where classroom libraries exist, the ideal of individualizing reading can be realized. A wide range of books can be purchased for a relatively small amount of money. Multiple copies of popular books can be provided.

Lack of long-range durability might be considered an asset as well as a defect where paperbacks are concerned. Curricula

change rapidly these days, it seems. When schools are saddled with expensive texts, there is a noticeable reluctance to burn them as better materials are developed. If more frequent evaluation of curricular materials is possible and even necessary due to a need to replace books, improved education can result.

The paperback movement has overcome, for the most part, the unfortunate image it projected in the early days of the lurid "best-seller". The BIPAD Committee (composed of members of the NEA and the American Association of School Librarians) annually selects nearly 3600 titles suitable for secondary school use. The emerging education market has forced publishers to eliminate sensational covers and blurbs on many volumes and an aura of respectability has grown around the educational paperbacks.

Because of the cost structure and favorable publishing methods, paperback publishing offers education a medium whereby new techniques can be tested. Such experimentation often has an influence on curriculum reform. I have already mentioned the impact of paperbacks on anthology. In Project English centers such as Euclid Junior High School, the staff has developed thematic and genre units which undergo continual evaluation and revision. Examples of genre units are *Symbolism*, *Satire*, and *Allegory*. Thematic units include *Man and Nature*, *Justice*, *Man and Culture* and *Survival*. Paperbacks play a major role in this unit approach. The unit on *Survival* includes study of *THE BRIDGE OVER THE RIVER KWAI*, *THE NUN'S STORY*, *MEN AGAINST THE SEA*, and various short stories and plays for the ninth grade. *Coming of Age*, an eighth grade unit, includes *JOHNNY TREMAIN*, *THE MEMBER OF THE WEDDING*, *BREAD* (a play) and *INSIDE A KID'S HEAD* (a play). *Symbolism*, a ninth grade genre unit, has *THE PEARL*, "The Butterfly", poetry and fables, and Biblical parables. Because of the low cost of class sizes of paperbacks, such units are feasible where they would be prohibitive if secured in hard-cover editions.

Curriculum reforms in mathematics and science have been aided by the paperback. The Science Study Series in physics and the New Mathematics Library, sponsored by the School Mathematics Study Group are examples of paperback publishing presenting reform. When Scholastic Magazines publishes paperbacks for elementary schools printed in the Initial Teaching Alphabet (ITA) in the near future, it will be interesting to observe the

impact of this availability on the acceptance of the technique. Programed instruction has previously appeared in quality paperback format. One of the drawbacks that the acceptance of this self-instructional technique has faced is the high cost of purchase. Few programers and fewer paperback publishers have realized the potential of publishing programs in mass-market paperbacks. Recently, however, some programs have begun to appear in books selling for under a dollar. We will probably see an increase in the publication of programs in mass-market paperbacks.

Because of the increased interest in the educational area, the major paperback publishers have formed educational divisions to serve the schools. This trend has resulted in special series for leisure reading, a growing emphasis on original textbook materials, and better service for the schools. Competition is intense and consequently healthy. Obscure titles that have been out of print for decades are now available in paperbacks. Great effort goes into making a better product for the reader.

One example of this effort is the recent Shakespeare competition. As reading teachers, it is interesting to compare and contrast the various editions. Emphasizing the merit of the various editions may demonstrate the thinking that has gone into wooing the reader and teacher. The Bantam editions offer a marginal notation device that allows the reader's eye to dart to the side of the page when he encounters an obscure word in the text instead of wandering all over the page looking for the note. This device interferes less with the continuity of thought than the traditional footnote. As a sidelight, it is amusing to note that a major textbook publisher imitated this device in its Shakespeare series in hardcover. Washington Square's Folger Library Shakespeare has the text on the right-hand side of the page and the notes on the facing page, which is also an advantage for the reader. Another recommendation for the student here is the ample space for student notes. Dell's Laurel Shakespeares have the largest typeface for readability. Avon's Shakespeares have rounded corners to discourage dog-earing the books.

Every subject in the curriculum has felt the influence of the paperback, from history to home economics, from chemistry to physical education, where the new isometrics technique is gaining popularity.

It is not always easy to keep up with the pace of paperback publication when 300 to 600 titles per month are being published.

Consider, for example, the case of the Michigan teacher who wanted to order supplementary reading material for a social studies unit on the Civil War and Reconstruction. He was gratified to see his class, and indeed, almost the entire school, show such an interest in his subject, for almost everywhere he went throughout the building, a student was avidly reading a book the teacher had assigned but had neglected to preview — *THE CARPETBAGGERS*. *Caveat emptor* is still good advice.

What is the significance of this medium? In a society geared to obsolescence, where architects omit bookshelves from their plans, the nature of the paperback appears to be in tune with the hum of frenetic living. Reading teachers observing students buying books for personal libraries at school book fairs must feel good about the trend. The attractive covers of many editions flooding the market place invite the reluctant reader and the sophisticate alike to share the pleasure of print for a while. If we are to encourage the lifetime reading habit with our teaching, reading must be rewarding, the book must suit the reader, and the environment, to borrow from Omar Moore, must be responsive. One way to surround our students with good reading without going bankrupt is to consider the paperback and what it can do for our cause. Its promise is powerful if we learn to use its potential to build the love of reading.

Factors In Critical Reading

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Improvement of critical reading ability is an acknowledged goal of many of the college reading programs in America, and of many courses in freshman English, rhetoric, or communications skills. A number of college reading handbooks—Stroud, Ammons, and Bamman (17), Glock (3), and Hill and Eller (4), for example—include assorted exercises for the extension of the critical skills, and a few complete textbooks are devoted to critical thinking and reading, usually with considerable emphasis upon logic. Altick's *Preface to Critical Reading* (1) is typical of these texts employed in teaching evaluative skill to college freshmen and sophomores.

Because college-level instruction in reading is usually provided by departments of English and education, the teaching methodologies commonly employed have been developed mainly by specialists from these two academic areas, and the bulk of the published materials have been created by authors who are either English instructors or professional educators or both. Inasmuch as reading teachers with English and education backgrounds tend to be skills-oriented rather than personality-oriented, the programs and materials which they have developed are directed toward the improvement of specific academic reading skills and give very little attention to the psychological, social, and emotional aspects of reading comprehension. Instruction in critical reading when planned by English teachers tends to feature the fundamentals of logic and the numerous propaganda devices against which the reader must learn to defend himself. Reading teachers trained in education departments, on the other hand, are inclined to construct and use exercises which appear to develop skills such as (1) determining the author's probable purpose, (2) gauging the extent of the writer's expertise, (3) detecting inconsistencies between statements of different authors and even within the writings of a single author, and (4) compensating for the known biases of standard publications such as the *Chicago Tribune* and *The Reporter*. Probably no one would argue that it is useless to teach these and other skills commonly pursued in college reading centers and rhetoric classes; the question is: Are there some factors in the process of reading comprehension which are so personal that

the mastery of the so-called reading skills does not assure the ability to read critically, at least in some types of printed matter?

The experimentation of social psychologists and communication theorists over the past two decades would seem to indicate that the foregoing question must be answered in the affirmative; that relationships between the reader's personality, the portion of society in which he functions, and various aspects of the communicative act have considerable bearing upon the whole comprehension process, including the evaluative acts known as critical reading. It is true that most of this experimentation was not performed with the purpose of checking on the factors which relate to critical reading ability, but the studies subsequently cited appear to have definite implications for reading comprehension in general and critical reading, *per se*. At the very least these experiments suggest numerous possibilities for research in the evaluative processes of reading comprehension.

Since there are numerous experiments in the psychology of communications which would seem to have implications for teachers of reading comprehension, some organizational scheme should prove helpful to a scrutiny of the research. Perhaps the simplest acceptable arrangement of evidence would be one employing four categories: (1) Who is trying to convey a message? (2) What is the message conveyed? (3) What is the nature of the mode of communication? (4) Who is the recipient of the message? Each of the several studies reported herein will be considered under one of the four questions. Of course, many other investigations could be reported; but the ones cited are representative, it is hoped. For certain of the experiments, contradictory data could be found elsewhere. The discrepancies among studies and the incomparability of some research works are attributable in part to the fact that different experimenters have based their designs upon different theoretical frameworks. Inasmuch as every one of these frameworks is at this point very incomplete, it is not surprising that research workers disagree concerning the interpretation of the findings of others as well as their own.

Who is trying to convey the message? Characteristics of the communicator which could be expected to influence the effectiveness or force of the communication are his (1) credibility, (2) prestige, and (3) attractiveness. The first of these has repeatedly been demonstrated to be a factor in communicative efficacy. In

1951, in a frequently-cited study, Hovland and Weiss (7) presented subjects (college students) with four articles, each of which was attributed by the experimenters to a highly credible source for half the subjects. A low-credibility individual was credited with the authorship of each article for the other half of the subjects. Analysis of subject responses indicated that communications attributed to high credibility sources were more often adjudged "fair" or "unbiased" than were the same communications attributed to low credibility writers, and the conclusions were more often considered "justified" when the subjects viewed the authors as of high credibility. Immediately following the reading the indication of change in opinion in the direction favored by an article was three-and-one-half times as great among those who thought they were reading the argument of a highly credible author as among subjects who viewed their author as having low credibility. However, this differential in attitude change did not persist. One month after the experiment no significant differences between groups could be detected. Although Mandell and Hovland (14) in 1952 were unable to establish significantly different changes in attitude among two groups, when one set of subjects thought they were reading the opinions of an author who was "suspect" and the other group viewed its author as "non-suspect", the bulk of the Yale studies of this variable of credibility indicates that a communicator who is perceived as credible or trustworthy is more persuasive than one not so perceived.

Bettelheim and Janowitz (2) mailed anti-Semitic literature attributed to various authors to several dozen male Gentiles. Analysis of responses revealed that the propaganda was more effective if it was attributed to a known Jew. The investigators interpreted this trend as an indication that the readers had regarded the ostensible Jewish authorship as reasonably objective.

In the matter of prestige as a characteristic of the communicator, Kishler (12) reported that the esteem in which Catholic priests were held by his subjects were related to the amount they learned from the motion picture "The Keys of the Kingdom" and to the magnitude of opinion change in the direction of religious tolerance. Kishler added the interesting observation that in this situation the subjects were reacting differentially, not to a genuine priest, but to an actor.

What is the nature of the communication? A number of variables in the content of a communication may be related to its

efficacy. One such variable concerns the "sidedness" of a presentation: Is a communication more persuasive if it presents only one side of an issue, or if it presents arguments on two sides? The research on this question is not entirely clear-cut, because the investigators have usually confounded the sidedness variable with some other factor such as the degrees of overt commitment (of subjects) to a certain point of view. However, Hovland et. al. (6) has attempted to summarize the literature with a few basic generalizations: (1) In the long run two-sided presentation is more effective than one-sided when the audience is subsequently exposed to counter-propaganda, regardless of initial opinions; or when the audience initially disagrees with the communicator's point of view, regardless of subsequent exposure to counter-propaganda. (2) One-sided communication is more effective than two-sided if the audience initially is in agreement with the point of view of the communicator and is not exposed to subsequent counter-propaganda. Klapper (13) modifies these generalizations with the addition of summary statements concerning some interacting variables: One-sided presentations are more effective with persons of limited education; one-sided communications are efficient persuaders of audiences which are required to publicly defend the presented view; and one-sided presentations are more susceptible to "boomerang" effect if the audience suspects that the communicator is "pouring it on" too much.

Somewhat related to the sidedness issue is the factor of order of presentation. Much of Hovland's 1957 volume (3) in the Yale series is devoted to a consideration of the effects of order of presentation and its interaction with other factors. The basic question is: If two different points of view are expressed to an audience, which is more persuasive, the argument presented first or the latter one? At the conclusion of a series of experiments on this primacy-versus-recency problem, Hovland settled upon the following summary statements: (1) If two opposing statements are offered by different communicators, the position stated first doesn't necessarily have the advantage. (2) If communicatees make a public endorsement of one side of an issue before exposure to the opposing side, subsequent presentation of the second side is less effective; hence, there is a primacy effect. However, the anonymous statements of opinion through the use of questionnaires after presentation of one side of a controversy does not significantly reduce the persuasiveness of the second (and opposing) presentation. (3) If both sides of a controversial issue are presented in a

single session by a single communicator, there is a distinct tendency for the viewpoints presented first to prevail. However, this primacy effect can be reduced either by interpolating other activities between the two presentations of controversy, or by warning the subjects against the tendency to respond to first impressions. (4) If communications highly desirable to the communicatees are presented first, followed by less desirable messages, there is more persuasion than when the reverse order is followed. (5) Order of presentation interacts with personality type to some extent in that experimental subjects with high cognition need are influenced by communications without regard for the order, whereas those with low cognitive needs demonstrate the law of primacy.

Another continuum which relates to persuasibility is the degree of specificity—as contrasted with implicitness—in the communicator's directives. As a rule, the persuasive effect is greater if the communicator draws specific conclusions rather than permitting the recipients to draw their own, or as Katz and Lazarsfeld summarized in 1955, "the more specific the suggestion which a personal contact makes, the more likely it is that his or her advice will be followed." (11, p. 17)

In at least a couple of respects the emotional quality of message content seems to relate to the effectiveness of the communication. One of them, the emotional-versus-rational appeal factor, obviously interacts with so many other elements in communicative process that present research only begins to describe its role. Weiss (18) presented three types of content information (one each) to his three experimental groups: group E read a highly inflammatory statement designed to arouse aggressive emotion concerning criminals; group R was confronted with a rational treatment containing factual data on the same subject; and group ER read a text which contained both emotional and rational approaches. The emotion content "induced a greater degree of expressed arousal" than the rational material. Because Weiss had administered a personality inventory to his subjects, he was also able to observe that the attitudes of the high authoritarian aggressives in the sample were significantly more punitive than the opinions of those who were low in this trait measurement, after exposure to the communications.

Another facet of the emotional quality of messages to be investigated by a number of workers is the level of fear induced, or the intensity of the threat. One of the oft-cited studies of this

facet was done by Janis and Fesback (9), who developed three forms of an illustrated lecture on dental hygiene with three different intensities of fear appeal, the most threatening of which included some rather disturbing views of pathological conditions. High school students who constituted the experimental samples revealed more conformity with the position on the communication when the fear level was lowest (of the three); that is, the actual dental practices of the teen-agers were modified least in the groups which had been exposed to the strongest—most fear-arousing appeal. Similar results have been derived from experiments which employed varying levels of fear in communications designed to induce subjects to provide themselves with bomb shelters.

What is the nature of the mode of communication? Of the four questions posed earlier, this is probably the least important to the teacher of critical reading skills, since he is concerned only with printed media, at least in his role as reading teacher. Then, too, the printed word is not a very forceful communicative agency in comparison with more personal and lively media, and thus interactions with other factors in opinion formation may be of less importance in the reading setting. At least two major generalizations, however, should be worthy of the reading teacher's notice: (1) The use of multiple media in communication results in greater persuasive effect than the use of a single media; and (2) the more personal means of communication are most effective in persuasion, so that for most recipients of presentations, "in-person" delivery, television and radio achieve more attitude change than reading matter.

What are the characteristics of the recipient of the communication? Manis and Blake (16, p. 225) introduced a recent article with the suggestion that "distorted interpretations of persuasive messages may often result from the recipient's attempt to maintain his existing beliefs in relatively unchanged form. Thus, given the fact that most messages can be reasonably interpreted in a variety of ways, it is assumed that the recipient will select that interpretation which is least challenging to his convictions." The manner in which existing views affect—by resistance or distortion—the acceptance of new opinions has attracted the attention of a number of writers who have investigated it from their differing theoretical bases. Several experimenters have dealt with this phenomenon under the heading of "selective exposure" and one of Manis' (15) 1961 studies illustrates this factor in operation. Three groups of college

students, whose attitudes towards fraternities varied, were confronted with a series of short messages about fraternities, half of them attributed to authors of high prestige, and half to writers of low prestige. After reading each passage the subjects attempted to describe fraternities as the author described them, using six evaluative rating scales. When the student readers reacted to the high prestige articles they distorted their reports of the authors' statements in the direction of their own original attitudes; for the low prestige articles there was no relationship between the subjects' views and their judgments of the authors' positions. Thus, if the students felt that the writer of a selection was an important person they tended to displace his position toward their own views of fraternities.

As might be expected, numerous psychologists have manifested curiosity concerning the relationships between certain personality characteristics of message recipients and their perception of persuasive presentations; however, the research on this relationship has not been as productive of definitive statements as in some of the areas already considered. The Yale Studies, particularly those directed by Janis, have led to a few findings worthy of mention. Janis himself (8) reported that low self-esteem is related to high persuasibility, and vice versa; thus, persons who do not value themselves highly tend to be susceptible to opinion change. Janis and Field (10) found no significant relationship between aggressiveness and persuasibility. Most other investigators have been unable to provide convincing data regarding any such relationship. Richness of fantasy was found to be positively related to persuasibility for males but not for females by Janis and Field. (10)

Group affiliations is another characteristic of the recipient of a communication which has bearing on his persuasibility and comprehension of the message. For three decades social psychologists have known that communications which accord with the general climate of opinion in a group are more likely to be accepted by persons who identify themselves with that group than messages that are at variance with group opinion.

Assorted other characteristics of communicators, their messages, media, and audiences have been explored in the search for factors which influence the moulding and changing of attitudes. The research and conclusions already cited are by no means exhaustive; they are included chiefly to demonstrate that a great

variety of factors influence the reaction which an individual recipient may have for a given persuasive communication.

Implications For Teaching Critical Reading

Most of the research which has explored factors and relationships in opinion change was not conducted specifically to aid the teacher of critical reading. In fact, some of it was performed under the auspices of advertising agencies with goals almost diametrically opposed to those of the reading teacher. Further, much of this research in communication psychology did not involve reading as a means of presentation; the subjects' reading was in some instances limited to responses to a pencil and paper instrument after the presentation. Yet certain broad implications seem justified on the basis of the research and theory in these avenues of social psychology.

(1) The conventional academic skills approach to the development of critical reading ability does not even touch upon some of the major sources of "uncriticalness".

(2) Research workers who are also specialists in reading instruction should conduct experiments which parallel many of the studies cited herein. Thus they will learn which of the factors which influence persuasibility in general communication are also important—and to what extent—in the critical reading processes.

(3) At least on an experimental basis some teachers of critical reading should incorporate into their methodologies moderately extensive consideration of the social psychology of communication—the facets of communicator, message and communicatee which influence persuasion and comprehension—in an attempt to improve critical reading skill by arming students with an understanding of some factors which ordinarily cause them to be uncritical. This type of instruction has been provided experimentally for at least a decade by Dr. Ralph H. Ojemann and his colleagues at the University of Iowa, apparently with some success.

(4) Reading comprehension is evidently a much more complicated process than the teaching method textbooks indicate, and must be completely re-considered in terms of the evidence handed over by the social psychologists.

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Ego Strength and Reading Disability

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Investigators have increasingly turned their attention away from the study of intelligence as it relates to the reading process to internal states such as values, emotions, interests, attitudes and mental set, and the influence or effect these states have on perception or on performance of the reading task. In supporting this trend Schonell (13, p. 18) states "It is fair to say that our interpretation of ineffective visual-perceptual habits is now largely in terms of personality maladjustment, together with ineffective training, rather than specific mental weakness." Barber, Bruner, Hall, Hartman, McDonald, and Spache concur in the belief that such factors as fear, hostility, lack of self confidence, lack of ego strength do relate to or have influence on the perceptual and reading process.

For a number of years Gestalt Psychology has been useful as a theoretical construct to fit the reading process. The idea of teaching a whole word or sentence to a child who reacts as a whole provides a fitting rationale for what educators have been trying to do. However, new ideas have been evolving which may facilitate the discovery of new aspects of the perceptual process. Allport (1, p. 305-306) in his book *Theories of Perception and the Concept of Structure* discusses what he calls "The Directive State Theory" of perception. Bruner and Postman are two of the main proponents of this theory. They postulate that needs, tensions, values, defenses and emotions of the individual have influence on the perceptual process; and that this "behavioral" approach has been neglected in Gestalt Psychology. They combine structural stimulus, effects of stimulus on receptors, afferent neurons, and the sensory and cortical areas with the functional or motivational states (emotions, needs, values) to form what is called a "central directive state."

Several investigations have been carried on with reference to internal states that might affect the reading process. George Spache (14) in his study, "Personality Patterns of Retarded Readers" using the *Rosenzweig Picture Frustration Study* found retarded readers "on the defensive and lacking in solution seeking behavior."

A. A. Hartman (9) in a study "Personality Factors in Perceptual Distortion" reports, "Emotional states such as anxiety, depression, rigidity, and withdrawal appear to produce characteristic changes in the accuracy of perception." Speaking of stimulus he says, "It is interpreted in terms of individual interests, needs and values: that if the student has need to avoid, reject or fear he will mis-perceive."

Since Barber's (2) study relates directly to the subject of ego strength and reading disability, it is reported here in greater detail. In her three year longitudinal study of 23 students with reading disability, she gave projective tests of personality (*Rorschach* and others), interviewed teachers and parents, and studied school records. Each of these students was matched with a pupil of equal I.Q. who could read well.

In summary she described the poor reader as having a 50-50 chance of being enuretic; as being dependent on mother; as having been over-supervised and directed; as having sibling rivalry; as often preferring younger children to play with; as openly seeking affection and approval of teacher; as having remarkably short attention span and poor concentration; and as giving the general impression of being immature.

Ego Strength Defined

Ego strength is defined by Barber as "the ability to gauge reality and synthesize behavior in appropriate goal directed activity, adequate for chronological age. It is used as a basis of evaluating emotional and social maturity . . . a consolidation of the child's sense of self in relation to his social and physical environment through learned patterns of adaptation."

Closely related to this concept of maturity, Woolf and Woolf (16) found in their study of college freshmen, one hundred good versus one hundred poor readers, that the poor readers were three years behind in interest maturity. The *Strong Interest Test* was used as a measure.

John and Elaine Cumming (4, p. 43) under the heading of Ego Ability say "that the clinical term 'ego strength' often used to indicate resistance to mental illness, we shall reserve to describe the general capacity of the ego—that is, the number and variety of sets, the generality and complexity of their organization, and the ability to hierarchize, select, and act out of appropriate organizations."

Hensie and Campbell (10, p. 257) define ego strength as "The effectiveness with which the ego discharges its various functions. A strong ego will not only mediate between id, superego, and reality and integrate these various functions, but further it will do so with enough flexibility so that energy will remain for creativity and other needs. This is in contrast to the rigid personality in which ego functions are maintained, but only at the cost of impoverishment of the personality."

Gottesman (7) in describing the function of the ego says, "The ego organizes and controls motility and perception (of self as well as the world); it serves as a protective barrier against excessive stimuli; action and thinking are also ego functions; it anticipates, synthesizes, and inhibits. Any of these functions may occur simultaneously. The ego must defend itself against id impulses, the reproaches of a punishing superego and the traumata of the real world."

Barron's (3) findings help define ego strength by his description of the characteristics of high scorers on the Es scale. "The general impression conveyed is one of greater resourcefulness, vitality and self direction in high scorers, and effeminacy, inhibition and affectation in low scorers. Barron equates vitality with "general energy level. Well directed energy," he says, "is characteristic of high scorers."

In defining low ego strength Dahlstrom and Welsch (5, p. 356) say "Low ego strength implies defects in self restraint, environmental mastery, or cognitive awareness that limit a person's ability to deal with the stressors, unfamiliar problems or hardships."

In summarizing these definitions, ego strength is that part of the personality which gauges reality and mobilizes the necessary energy to cope with it. A strength which economically mediates between basic urges, inner needs, conscience, and the demands of the outer world. It implies a flexibility as opposed to stereotype or rigidity, an ability to be aware of and to react appropriately to a given situation; to simultaneously or individually perform several functions at the same time e.g. anticipate, synthesize, inhibit, defend, discriminate, hierarchize, select an appropriate act out of a repertoire. It can act as a protective barrier against excessive stimuli. Ego strength seems to be a blend of intelligence and emotions; properly blended it is strong, improperly blended it is weak. There is also the connotation that emotional maturity is

associated with high ego strength, and contra-wise emotional immaturity is associated with low ego strength.

Validity

The validity of Barron's Ego strength scale for the *Minnesota Multiphasic Personality Inventory* is substantiated by several studies.

Benjamin Kleinmuntz (11) found the Es scale to discriminate between maladjusted and adjusted students at the University of Nebraska. The means for the two groups are as follows:

N	Groups	Ego strength	Critical Ratio
50	adjusted	50.16	3.35
33	maladjusted	45.21	

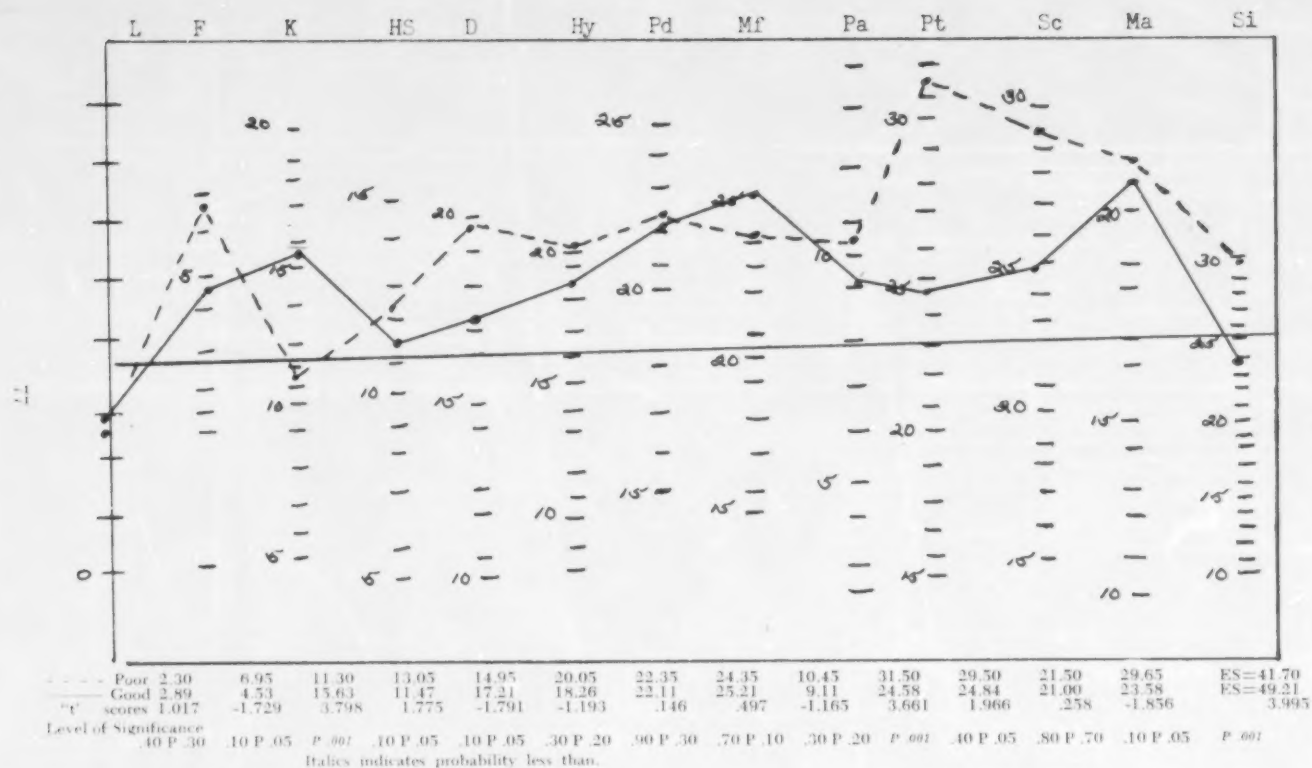
Ronald Taft (15) states that "The validity of the Es scale is confirmed in that it successfully distinguishes the normal from the clinical subjects."

Gross and Levitt (8) in reference to the Ego strength scale says it "Is genuinely measuring ego strength or some similar trait associated with psycho-pathological conditions."

Korman (12) reveals in his study that where higher mental processes are involved those with high ego strength resolve a discrimination conflict situation more speedily than those with low ego strength. He used the Barron Scale for the M.M.P.I. to sort out his groups. In the same vein Worrell and Hill (17) found high scorers on the Es scale could "solve both simple and difficult discrimination conflict situations faster and with more rapid improvement."

Purpose. The purpose of this study is to determine if there is a difference in ego strength between a group that reads well and one that has reading disability. It is hypothesized that poor readers will have less ego strength than good readers as measured by the Barron scale on the *Minnesota Multiphasic Personality Inventory*.

Procedure. The reading disability group (20 freshman boys) was chosen from students enrolled in the college reading clinic. The good reading group (19 freshman boys) was selected from a freshman English Composition I class. Selection of each group was made on the basis of general college entrance tests and a reading test. The group means on the A.C.T. were very close together on the English and Mathematics sections (no statistically significant



difference) while on the social studies (.02 level) and natural science (.05 level) sections the poor readers ranked significantly lower than the good reading group.

The *M.M.P.I.* was administered to both groups using Barron's scale to assess Ego strength. The diagnostic scales were also scored and compared for both groups.

The statistical treatment of the data consisted of a comparison of means of all *M.M.P.I.* scales for the two groups by a critical ratio technique using "t" scores as a test of significance.

Results. An inspection of the profiles in Chart I shows both groups to be essentially in the normal range. That is, the two profiles with the exception of scales 7 (Pt) and 8 (Sc) for the poor reading group deviate but little from the official norm and not enough to show pathology.

The poor reading group does show elevations on two clinical scales, 7 and 8, with scale 7 significantly higher statistically and in the direction of pathology than that produced by good readers.

The two groups also differ on scales F, K, Hs, D, and Es. With the exception of "K" and Es the differences on these scales just reach the .05 level of confidence. The "K" and Es scale separate the groups more conclusively.

Discussion. Of these differences the general factors of ego strength, "K" and the clinical trait of Pt (psychosthenia) loom high in importance. The rest, while probably affecting the reading process, are not remarkable. Sc might be a possible exception since it has a higher "t" score, has a higher elevation from the mean and since it would affect the perceptual process adversely.

In consulting "t" scores conversion tables for special *M.M.P.I.* scales for ego strength in the *M.M.P.I.* handbook, the mean of the good readers ranks at a standard score of 58 while the mean of the poor readers ranks them at the standard score of 45. Referring these means of each group to those of Kleinmuntz's group at the University of Nebraska, the poor readers would look like clinical subjects while the good readers would look adjusted. About 5 points separated his adjusted from his maladjusted groups while 8 points separated the poor and good reading groups in this study.

Anxiety, K, and below average ego strength are linked with reading disability. Anxiety manifests itself in lack of self confi-

dence, worry, and inability to concentrate, while a lack of ego strength manifests itself in intellectual inefficiency, narrow interests, lack of confidence, and reduced energy level.

A lack of "K" manifests itself in tendencies toward seclusiveness, self criticism, non verbalness, and poor defenses.

The foregoing discussion combined with earlier definitions of Es and Pt would imply that the poor reader suffers from immature ego development and from some defect in the cognitive process.

Summary

The purpose of the study was to discover the relationship of ego strength to reading disability. It was hypothesized that poor readers would have less ego strength when compared to good readers, using the Es research scale of the *M.M.P.I.* as a measure. The hypothesis was confirmed showing a statistically significant difference between the two groups. Other scales on which significant differences were found were K and Pt. All three of these variables are linked with reading disability.

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The Contributions of College Reading Specialists to Pre-College Reading Programs

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Many qualified young men and women find it difficult to secure admission to a reputable college or university because of the great influx of students already taxing the physical facilities of our schools. Universities are becoming more highly selective in their admission procedures, virtually limiting consideration to those whose high school records have been outstanding or to those who can give evidence of having mastered the special skills necessary for success in college.

A student's acceptance by a university signifies that he is guaranteed an opportunity to prove his ability. Throughout his college career, however, the student is confronted with a caliber of competition which demands his very best. If he is to succeed, the student must meet the inevitable challenge of maintaining his place in college. He soon learns that there are more demands placed on intellectual skills than in his previous schooling. Reading ability becomes of paramount importance, and the whole environment demands of him a higher level of thinking. Gibson says, "Let us read with method and propose to ourselves an end to what our studies may permit. The use of reading is to aid us in thinking." High school and college students are expected to generalize, draw inferences and conclusions, and appreciate subtleties of style and content. They apply ideas read to society and to personal problems. They find textbooks more difficult, study periods longer, and a high level of concentration required for achievement. The assignments are more difficult and complex, and these newcomers to the college campus must adapt their reading to meet their new needs. Most of these skills should be mastered at high school level. The college reading specialists are in a unique position to make contributions to the pre-college reading programs because the greater portion of study activities in college requires skill in reading for successful achievement.

A survey of the contributions and services of the college reading specialists to the pre-college reading program reveals the following:

Research

Much research, done by the college reading specialists, is reported in articles and books in the field of reading.

Clinical Services

Clinical services include diagnostic, remedial and preventive assistance. Diagnostic service encompasses diagnosis of the reading needs of children, students, and adults; including testing in the areas of reading (oral, silent, word analysis, understanding, etc.) capacity, vision and dominance.

Remedial service consists of individual instruction for children, students, and adults based on individual diagnosis as described under diagnostic services.

Pre-school consists of "preventive education" classes for children before they enter school.

Reading Improvement Services

Reading improvement services are designed for students and adults of any age who are average or good readers and could profit from group or self-instruction and use the newest programed materials, teaching machines, multi-level materials, and tachistoscopic and Controlled Reader training in reading, vocabulary, spelling, phonics, grammar, composition, study skills, and listening. Courses are particularly appropriate for advanced elementary or college or high school students who are skilled at pacing themselves in learning situations. These services are classified as Developmental Reading and School Skills Programs. Separate courses are offered for elementary and senior high school students, college students, and adults who wish to improve their reading and comprehension. The adult programs also include improvement classes for special groups of adults, such as businessmen, upon request.

Consultant Services

The college reading specialists and their staffs are available for consultant services to public and private schools and teachers of reading by special arrangement.

Institutes and Conferences

Institutes and conferences are offered on a credit and non-credit basis featuring addresses by nationally known reading

specialists followed by discussion. At these institutes and conferences there are comprehensive exhibits of programed instruction, controlled reading and other devices used; published materials are adapted to the needs of readers at all interest and achievement levels.

Professional Organizations

College reading specialists are members of and participate actively in reading associations. These are professional organizations for individual and groups concerned with the improvement of reading. They include local and state organizations and the following reading associations: College, National and International. These organizations have an eightfold purpose: (1) to encourage the study of reading problems, (2) to stimulate and promote research in developmental, corrective and remedial reading, (3) to study the various factors that influence progress in reading, (4) to publish the results of pertinent and significant investigations and practices, (5) to assist in the development of more adequate teacher education programs, (6) to act as a clearing house for information relating to reading, (7) to disseminate knowledge helpful in the solution of problems related to reading, and (8) to sponsor conferences and meetings planned to implement the purposes of their organizations.

Teacher Education Services

The college reading specialists offer opportunities for elementary, high school and college teachers featuring a survey of the problems in reading, review of recent research, methods, and techniques leading to the solution of opportunities in reading with related practical experiences in working with the various age groups under supervision and observation of the specialized phases of reading work. Minimum essentials for such a program should include the following: (1) fundamental principles of teaching reading, (2) characteristics of a developmental reading program, (3) locating, diagnosing, and interpreting reading difficulties, (4) ability grouping (teaching the remedial, average, and gifted), and (5) techniques in teaching reading skills.

Experience has proven that it is best to have the teachers take the reading course themselves before taking the course in special methods. "We are now in want of an art to teach how books are to be read rather than to read them. Such an art is practicable." —Disraeli.

The program of teacher training, which may be considered the largest contribution that the college reading specialist can make, should be the type of course that is necessarily a correlation between theory and practice. It is difficult to determine the exact content of these courses from catalog descriptions. Therefore, the writer secures the following material from the course he offers.

To adequately survey the problems, the first part of the course consists of a review of recent research, a study of the adolescent learner's reading needs, objectives of reading instruction in the secondary school and provisions for individual differences.

Consideration is given to the types of problems encountered, recognition of individual difficulties and suggested ameliorations. These problems include visual, auditory, poor motor control, speech defects, emotional disturbances, vocalizers and sub-vocalizers.

An appraisal of individual skills and habits is used to establish instructional needs. Formal and informal methods are used in the appraisal of capacity, vision, word recognition skills (structural analysis, phonetic analysis, contextual clues, configuration, syllabifications, dictionary usage), vocabulary, spelling, silent reading comprehension, listening comprehension, rate and flexibility of reading, study habits and skills, and locational skills.

Planned instruction in the following skills emphasized their relatedness:

Development of rate and flexibility. The skills of skimming, scanning, speed reading, study reading and reflective reading together with the skill of moving quickly from one to another received emphasis and practice during instruction. An examination of differing purposes for reading, both in and out of school served as a background for the student's learning to determine purposes and appropriate rates before he reads.

Increased comprehension. Instruction is given for the development of skills on three levels of comprehension: (1) reading the lines and repeating what the author says, (2) reading between the lines and interpreting and evaluating, (3) reading beyond the lines and reflecting, synthesizing, and drawing inferences and conclusions. Such instruction gives attention to selections differing in purpose and type. A study of comprehension also included instruction in organizational patterns of sentences, paragraphs and composition of the several paragraphs. Development of listening comprehension parallels the reading instruction.

Strengthening word recognition skills. Instruction is planned on the basis of the student's knowledge and use of phonetic analysis, structural analysis, syllabication, context clues and the dictionary as tools for attacking new words, familiar words and familiar words with new meanings.

Vocabulary development. Basic to other reading skills, vocabulary is taught both directly and indirectly, but always in context. Directing a student's growth in vocabulary requires attention to words in a wide variety of reading-listening contexts, the use of dictionary, and study of language (word origins, meaning, usage, semantics, denotation and connotation). A systematic plan for learning new words was developed for the student with the hope that it would become habitual through practice.

Development of study skills. A plan for study reading, the PQIRST (preview, question, read, state and test) is taught and practiced. Instruction in other skills used in school work is included e.g., listening, notetaking, examination taking, and related matters such as remembering, concentrating, budgeting time, etc.

Locational skills. Some attention is given to the student's skills in finding what he needs to read: using a book (index, table of contents, appendixes and other parts), and using general and specialized reference books.

Extension of individual reading. The student is guided and stimulated in his personal reading. Skills and techniques developed in the course are related continually to the student's reading, in school and out of school.

A variety of reading materials is used for instruction and practice. Mechanical and electronic devices are employed for individual and group instruction. They are used for one or more of these purposes: training for improvement of accuracy in visual perception, training in directional attack for improvement of left-to-right eye movement and elimination of regression, controlled devices for improvement of rate. The devices included are: tachistoscopic projections (speed-i-o-scope, time-x, flash-x, overhead), perceptoscope, metronscope, EDL Controlled Reader and filmstrips, Iowa Films, Harvard Films, Programed Learning, Community resources for helping reading problems and an explanation of EDL's Reading 300 program for secondary schools.

Reading 300 is a laboratory approach to developmental reading instruction for secondary schools. It is individualized, largely self-

instructional, flexible, multi-media approach to reading based on research and successful usage. It provides instruction in a wide variety of reading skills which are introduced and developed in a carefully planned sequence. Instruction, training, or guidance are provided in twelve major areas which have been judged the most critical to the development of effective and efficient readers. These are:

1. Perceptual Skills—identification, recognition, and association of printed symbols with meaning.
2. Visual Functioning—binocular coordination and motility.
3. Word Knowledge—central and transferred word meanings in contextual settings.
4. Word Attack Skills—structural and phonetic analysis.
5. Comprehension Fundamentals—recall, understanding, organizing.
6. Interpretation—concluding, comparing, predicting, sensing, visualizing.
7. Analytical Reading—minute detail and over-all structure.
8. Critical Reading—relevancy, accuracy, validity, significance.
9. Reference Skills—location of information—usage of materials.
10. Selective Reading—skimming—scanning.
11. Guidance in Reading—attitudes, habits, interest, taste.
12. Allied Communication Skills—listening, speaking and writing.

Summary

In summary, it is evident that the contributions of college reading specialists to pre-college reading programs are broad in scope and effective in nature. While it is true that variation exists in the contributions made by college reading specialists from campus to campus, there are, nonetheless, salient identifying characteristics of high quality programs which this presentation has sought to enumerate and describe. We cannot rest upon our laurels; much remains to be done in research and program improvement to obtain optimum results.

Preparing Adequate College-Adult Readers through Public School Development of Reading Programs

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Dallas Public Schools

Setting the Scene

The basal reader's teacher guide, which is one of our developmental reading teaching tools, designates the readiness or preparatory step in teaching a lesson as Setting the Scene. A part of this scene setting is new vocabulary development by context.

The Metropolitan School Study Council's *Five Steps to Reading Success* (1), a developmental aid which some of our secondary mathematics, science, and social studies teachers continue to find useful, includes new vocabulary in context as part of its concept development in setting the scene for a new unit or a new lesson.

Adequate as the descriptive term for preparing the college-adult reader will need context consideration—adequate for what? The statistical context of the College Entrance Examination Board's *Manual of Freshman Class Profiles* and Barron's *Profiles of American Colleges* suggests a variety of expectancies on the part of colleges regarding the range of adequacies of entering students.

A sampling of student profiles from three Texas universities which our students attend provides informative contexts for the term *adequate*. At the University of Texas, in Austin, 50 per cent of the men and 60 per cent of the women of the Freshman class of 1962 were in the top quarter of their high school graduating classes. The SAT range was 250-800 with the verbal average in the 450-499 range. Information from Rice University at Houston shows that more than 64 per cent of its entering Freshmen were from the top 5 per cent of their high school graduating classes. The SAT range was 550-800 with the verbal average 666. The profile of North Texas State University at Denton shows that an applicant must be a high school graduate with 15 units of work, which should include 3 of English, 2 of mathematics, and 2 of social science. Our students whose measured performances on standardized mental maturity and achievement tests show them to be in the upper quartile of their graduating class attend all three universities; students whose measured performances on standard-

ized tests show them to be in the lower quartile of their classes may attend two of them. The context of these college profiles suggests this question: adequate for what kind and what use of college-adult reading?

Gray and Rogers (2, p. 54-55), describe the mature reader as one who has genuine enthusiasm for reading; who reads widely, seriously, and intensively; who comprehends difficult materials; who makes use of the reading done and incorporates it with previous experiences; who evaluates reading critically; and who adjusts reading rate to purpose and occasion.

Russell (3, p. 241), suggests the "modest" adult reader is one who regularly reads the daily newspaper and several magazines above the pulp level, occasionally reads books relating to special interests, and uses libraries or other informational sources as needs arise.

A dictionary definition of *adequate* is *barely* sufficient and *fully* sufficient.

The profile of the adequate college-adult reader likely ranges between the lower quartile and upper quartile of the descriptions given by Gray, Rogers, and Russell in accordance with what we mean by *adequate*. Of prime importance is the personal involvement of the college-adult reader in his reading interests and needs.

Public School Developmental Preparation

The reading responses described as characteristic of both mature and modest adult reader get their start in the school developmental program; the range of adequacy which is accomplished, be it fully sufficient or barely sufficient, will be related to the pupil's growth potential, to his home environment, and to his school environment. Our public school developmental reading program aims at helping each pupil grow to be as adequate as his physical, intellectual, emotional, and social potential will allow.

Developmental reading is an integral part of our total school curriculum, not an isolated segment. Systematic instruction in sequential reading skills is presented through the basal reading program in the English-language arts classes, grades 1-8. The classroom pattern is small group instruction according to skills development, based on the teacher's diagnostic study of the pupils to gain insight into degrees of competence. Standardized tests, both mental maturity and achievement, are administered throughout the pupil's school life; classroom informal tests and observation,

and progress records are other diagnostic resources used. We try to recognize the built-in sequence of the child's skills growth through use of the needed teaching technique and resources of varying kinds and varying levels of difficulty, rather than solely by the use of a reader or readers or trade books of one level of difficulty.

The English-language arts classes continue beyond grade eight to be a base source for teaching reading skills. But from the fourth grade, when departmentalization of classes begins, content teachers are encouraged and expected to assume responsibility for teaching students how to study their particular subjects. The unit is our basic pattern of organization for instruction. Curriculum guides and related instructional materials; continuing inservice sessions led by principals, individual consultants, and consultant teams; and classroom visitation and personal conferences help teachers gain understandings of problem solving approaches to learning and of ways of invoking both simple and complex reading responses from students.

Our observation is that as teachers grow in their understanding of the differing abilities of children and young people to respond to academic learning, they are readier to understand why pupils continue to profit from study skills instruction throughout the public school grades. One way a teacher's instructional growth shows is how he introduces a new lesson as he moves from assigning pages or a chapter to such steps as asking questions which relate previous experiences to the new, introducing new vocabulary, establishing purposes for reading, and thus encouraging self-involvement on the part of students.

The school library in each elementary and secondary school has a trained teacher-librarian who influences directly the pupil's reading interests and tastes and who serves as a guide for the teachers in their selection of multiple resources.

Another facet of the developmental program is the clinical reading program which offers special reading assistance to capable students who are not reading within their potential.

Student Response to Some Aspects of the Developmental Reading Program

The following summary gives a sampling of student expression about what and how the students are reading and how or when they learned specific reading skills. To get these impressions five

English teachers in schools of white middle to upper middle class communities in different parts of the city gave an informal introspective survey to their senior and sophomore classes. The summary comes from a random sampling of those who checked that they were taking college preparatory subjects: 220 seniors, 63 in high academic and honors classes (upper quartile of their classes), 157 in heterogeneous classes; 162 sophomores, 75 in high academic and honors classes, 87 in heterogeneous classes. Student comments are related to vocabulary, study skills, and personal reading. The recording is done in multiples of five.

Most of the students, both seniors and sophomores (90-95%) said they used context clues in their reading. They credited their first use of context as a way of vocabulary building as follows:

Elementary school	50%	Junior high	15%
Do not know	20%	Senior high	10%
"Have always done this—worked it out by myself, I think, but a teacher may have helped."			
			10%

There is some overlapping between elementary school, where context was introduced, and secondary schools where context was really used "when reading got more difficult."

The "I don't know" answers came largely from students in the heterogeneous classes; the "Have always done this—" from the honors and high academic classes.

Seniors and sophomores showed approximately the same response percentages in use of context, but they varied on use of derivatives as a vocabulary building device, with 90 per cent of the seniors marking "yes," 65 per cent of the sophomores. They credited their becoming aware of this vocabulary device as follows:

Elementary school (spelling)

		Junior high English classes	25%
Seniors	40%	don't know	Seniors 10%
Sophomores	50%		Sophomores 20%
Foreign language		Senior high English classes	
Seniors	35%		Seniors 20%
Sophomores	20%		Sophomores 10%

Overlapping here comes from responses to three learning sources: elementary school and foreign languages, elementary school and secondary English, and foreign language and secondary

English. Elementary school was credited with introducing roots, prefixes, and suffixes, but the real understanding of their usefulness came in foreign language and in secondary English classes.

The students who cited foreign language as a learning source were mostly from high academic and honors groups. In both vocabulary responses, the "don't know" answer came largely from heterogeneous classes.

More than half of the students identified themselves as reading widely: 75 per cent of the seniors, 60 per cent of the sophomores. An additional 20 per cent of the sophomores gave a qualified "some," or "I read what I'm interested in." Interest reading volunteered several times by this last group was biography, adventure stories, science fiction, mysteries, sports, cars, magazine articles, and newspapers.

Most of the students (85%) said they thought wide reading was an effective way of increasing vocabulary. "Definitely," "the main way," "I know it does," are samples of volunteer comments repeated often. Of the smaller number who said "No," "I'm not sure," or "perhaps unconsciously," about one-half said they did not read widely, one-half said they did.

The questions on study skills were based on flexibility of reading rate in relation to the purpose for which one is reading and the use of the preview or survey technique. Approximately the same number of seniors and sophomores (75-80%) marked that they had, to some extent, learned how to skim, read rapidly, or read deliberately according to the difficulty of the material and the purpose they had in reading. A smaller number (65-70%) said they used the preview or survey technique in some of their study reading.

Answers to how or when they learned these study helps showed as follows:

Senior high	Seniors	30%	don't know	Seniors	20%
	Sophomores	15%		Sophomores	25%
junior high	Seniors	20%	"I worked these out for myself because I needed them, I think."		
	Sophomores	20%			
Elementary	Seniors	10%		Seniors	20%
	Sophomores	20%		Sophomores	20%

Elementary and secondary social studies classes and English-language arts classes were the sources named repeatedly where the study skills were learned.

As in the vocabulary responses, heterogeneous seniors and sophomores comprised most of the students who marked "No," meaning they did not know where they had learned these skills. Those who commented that they had worked out these ways of reading for themselves were chiefly from the high academic and honors classes.

Because patterns of boy-girl differences showed in responses to questions about the reading the students said they were doing, the responses are listed separately. The students were invited to check more than one kind of reading if they wished.

	Senior boys	Senior girls	Sophomore boys	Sophomore girls
Are you most at ease reading in:				
Science	40%	10%	40%	10%
Social studies	45%	35%	50%	30%
Literature	80%	80%	65%	70%
Are you challenged most (find new ideas, perhaps find diffi- cult) reading in:				
Science	65%	70%	70%	70%
Social studies	20%	10%	35%	30%
Literature	40%	10%	35%	20%
Do you read most in:				
Science	40%	5%	20%	15%
Social studies	40%	20%	35%	20%
Literature	70%	75%	60%	80%

The two ideas in the question, "Are you challenged most (find new ideas, perhaps find difficult)" lends itself to two kinds of responses. Several girls underlined "find more difficult." Their majority choice of literature as the content type in which they were most at ease and read most, and their small per cent of science checks in the same areas may suggest that many of them consider science difficult. More boys than girls checked that they were at ease reading science, even though they too had a majority check in literature; their response may suggest the "find new ideas" concept was theirs. The majority of all students who checked science as an area in which they were at ease and read most were in the high academic and honors classes.

The high percentage of all students reading literature in comparison to science and social studies may be affected by (1) the possibility that more items classified as literature are assigned for reading in secondary classes; (2) pupils having had more continuing experiences with fiction, drama, poetry, and biography in the wide range of elementary and secondary readers and literature texts than with expository, factual reading which relates to reading patterns in science and social studies; and (3) the possibility that students may have used the broad classification of literature to indicate almost any writing not straight factual; for example, a few students wrote "fiction" in the literature check place. The total percentage may be affected by inclusion of honors and high academic English classes. A survey of this kind from high academic and honors science classes might yield different percentages.

Scattered listings of mathematics, music, homemaking, and art were written by "other."

By use of Russell's explanation of levels of reading (4, p. 77-78), as a guide statement, the students checked what they thought they were usually reading for. Boys and girls differed some; both checked more than one level if they wished.

In science, do you usually read for:	Senior boys	Senior girls	Sophomore boys	Sophomore girls
General impression	10%	10%	10%	5%
Information	80%	90%	80%	80%
Interpretation	15%	10%	10%	5%
Impact	10%	—	10%	10%
In social studies for:				
General impression	45%	50%	20%	20%
Information	80%	70%	80%	65%
Interpretation	20%	15%	10%	10%
Impact	15%	7%	5%	5%
In literature for:				
General impression	45%	40%	30%	20%
Information	40%	35%	30%	10%
Interpretation	30%	90%	50%	65%
Impact	50%	60%	30%	35%

Science is the content area in which these students see themselves as reading primarily for information. Science textbooks likely lend themselves largely to explaining, classifying, or organizing facts. The students may even see "drawing a conclusion" (a subtopic listed for "interpretation") from performing and reporting

on laboratory experiments as solely a performing act rather than a performing act with reading relationships.

The traditional classroom emphasis upon understanding, interpreting, and personal reaction to fiction, drama, poetry, and biography may be reflected in the responses of these students to the items in reading literature.

Conclusion

These varied student responses remind us of the diversity of reading performances and interests which we may find in students who say they are preparing for college. There is a range from the modest to the mature, from the barely sufficient to the fully sufficient. As a public school developmental reading program seeks to improve reading skills, it tries to help young people discover for themselves that their interests, needs, and goals affect the adequacy of their reading. As the two develop together, the young person will be able to answer for himself *adequate* for what kind and what use of college-adult reading.

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Meeting the Reading Needs of Students Preparing of College Study

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This paper will describe how one Improvement of Reading class for high school graduates was planned to meet the needs of students preparing for college. The program was designed to develop skills and attitudes helpful in achieving success in college. A special emphasis was placed on discussion of attitudes desirable in study.

Attitudes

Discussions of attitudes and emotions were given because they are important to learning success and because many students believe that satisfactory achievement depends entirely on ability and practice. Few students seem to give consideration to the part attitudes and emotions play in setting goals and giving energy with which to pursue them.

Spache (2) remind us in an article about study skills that teachers must be cognizant of the significance of pupil personality and attitude toward study practices. He says,

"Because they differ in their habits and their motivation, rather than in the knowledge of what constitutes good study practice, poor students can mouth the principle and the rules of good study and tell you what they should be doing or what the books on how to study say they should be doing. They are as aware of these facts, this informational aspect of it, as good students, but they do not have the habit, the attitudes and the feelings which enable them to put these practices into effect consistently."

Eller and Hill (1) state, "Above all, reading power involves an attitude—an intense thirst for information."

The lectures given in this class being described included thoughts on attitudes and feelings woven in with explanations of skills. The purpose of wanting to mold or change attitudes was unannounced, however. Some of the discussions were as follows:

1. Have faith in your ability. Permeate your thoughts with "I can."
2. Put your subconscious mind to work. No skill is perfected until you do.

3. Respect work.
4. Concentrate your effort and use all your mind and heart on the task at hand.
5. Don't let the writer control you. Be in control yourself as the reader.
6. Develop interest. Remember that real interest follows acting interested.
7. Keep a vision of worthwhile reward in your mind.
8. Keep an open mind. Bias and prejudice make mental blind spots.
9. Compete with yourself.
10. Enjoy collecting knowledge.
11. Connect your task with your ambitions.

Skills

The skills development was organized with the purposes of developing flexibility of reading, increasing vocabulary, improving study skills and meeting individual needs and levels of achievement.

The Nelson-Denny Reading Test and The Versality Test were given and the results used to help form groups for some activities and to assign materials to meet individual needs and levels for other activities. Interviews and observations also were helpful in making individual assignments.

Class discussions, group activities and individual assignments dealt with the following:

Flexibility	Sequence
Skimming	Vocabulary Development
Scanning	Word Attack
Speeded Comprehension	Summarizing
Critical Reading	Propaganda Techniques
Paragraph Patterns	Study Formula SQ3R
Inference	Listening
Conclusions	

Materials used are listed as follows:

Improve Your Reading Ability, Arthur W. Heilman, Charles E. Merrill Books, Inc., Columbus, Ohio.

Power in Reading Skills, Walter Hill and William Eller, Wadsworth Publishing Company, Belmont, California.

Efficient Reading, Brown, D. C. Heath and Company, Boston.

Improving Reading Skills in College Subjects, Cheffington, Bureau of Publications, Teachers College, Columbia University.

Making Better Readers, Strang and Bracken, D. C. Heath and Company, Boston.

The Art of Book Reading, Stella I. Center, Charles Scribner's Sons, New York.

The Art of Efficient Reading, George D. Spache, Paul C. Berg, The MacMillan Company, New York.

Listen and Read Series of Recording M-P, Educational Developmental Laboratories, Huntington, New York.

Listening and Read Workbook M-P, Taylor, Frackenpohl, Dechant, Educational Developmental Laboratories, Huntington, New York.

EDI, Word Clues, Books J. K. L., M. Taylor, Frackenpohl, Dechant, Educational Developmental Laboratories, Huntington, New York.

Controlled Reader Study, Set K-L, M-N, Taylor, Frackenpohl, Schleich, Gibson, Educational Developmental Laboratories, Huntington, New York.

Words Are Important (Introductory Book, First Book, Second Book, Third Book, Fourth Book, Fifth Book) H. C. Hardwick, C. S. Hammond and Company, Maplewood, New Jersey.

How to Study in College, Paul, Houghton Mifflin Company, Boston.

Better Reading Book 1, Book 2, Book 3, Simpson, Science Research Associates, Inc., Chicago, Illinois.

Reading for Understanding, Thurstone, Science Research Associates, Chicago, Illinois.

Tactics in Reading, Niles, Bracken, Dougherty, Kinder, Scott-Foresman and Company, Chicago.

Skimming and Scanning Workbook, Berg, Taylor, Frackenpohl, Educational Developmental Laboratories, Huntington, New York.

Skimming and Scanning Text, Berg, Taylor, Frackenpohl, Educational Developmental Laboratories, Huntington, New York.

The results of this 50-hour class of reading improvement were gratifying and the students were enthusiastic. The percentages of gain were high for all except one student.

Some of the remarks made by students in writing their reactions to the course led the teacher to her conclusions.

Here are some excerpts from their remarks:

"To gain confidence is the most important factor in one's ability to improve."

"This course helped me more than any math course, science course or history course that I have ever taken. Thank you for your continued and complete faith in us."

"Your 'pep talks' always made me work harder to achieve my goals. When you gave us those little talks, you got me excited, and I always did better."

"This course showed me I could read if I tried. I realized that most of my trouble had been lack of concentration and lapsing into 'lazy reading'."

"The coaxing from the teacher to really apply oneself was quite helpful."

"You said that we should try to make everything vitally interesting to us, and this has helped."

"You have helped my problem of going to sleep. You have also helped me from becoming discouraged. I have tried to improve my reading before, but I always became discouraged and never improved."

The manner in which the students learned to approach their work and remarks such as those quoted made the teacher feel that she had achieved her purpose of affecting attitudes and emotions helpful in study of the class members.

Along with the computed gains made on comprehension checks of filmstrips and practice exercises, it is felt that this achievement had helped in the preparation of the students for college reading and study tasks.

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A Comparative Study of the Attitudes of Parents of Superior and Inferior Readers Toward Certain Child Rearing Practices

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Research (2, 3, 5, 7) reveals that objectively measured attitudes toward various aspects of child rearing are significantly related to personality development, behavioral characteristics and speech difficulties of children. Is it possible that there is also a relationship between parental attitudes toward certain child rearing practices and children's reading achievement? The findings of the few investigators who have studied this problem are inconclusive. Vickery (9, p. 56-57) found that parents of good readers had significantly different child rearing attitudes from parents of poor readers. Parents of good readers favored to a high degree attitudes which reflected permissive child rearing practices. McKinley (4), on the other hand, found no appreciable relationship between maternal child rearing attitudes and children's reading performance. It should be pointed out, however, that McKinley combined scales on the *Parental Attitude Research Instrument* (8) and therefore may have obscured trends which could have been noted if the individual scales had been used.

The purpose of this study is to determine whether parents of superior readers differ from parents of inferior readers with respect to their attitudes toward certain child rearing practices and to determine, in a limited way, what the nature of these differences may be. The study is concerned only with parental attitudes as inferred by responses to a paper and pencil inventory.

Description of the Parental Attitude Research Instrument

The *Parental Attitude Research Instrument* has been designed by Schaefer and Bell (8) for use with mothers of various educational and socioeconomic levels. Internal consistency and test-retest reliabilities are reported to be satisfactory. Mussen (6, p. 441) has stated, "The extremely careful design of the scale, reflected in its comprehensiveness, efficiency and objectivity, makes it the most adequate parental attitude questionnaire available for

research." The instrument consists of 23 five-items scales. Each item is a statement about child rearing and family life. The respondent is required to encircle a letter denoting one of four responses about the item: strong agreement, mild agreement, mild disagreement, and strong disagreement. Most of the items are constructed so that strong agreement reflects a pathological attitude. Rapport items, however, are stated to encourage agreement.

In this study only ten of the 23 scales which seemed to the investigator to be related to reading achievement were utilized. A description of each of the scales is provided.

1. *Fostering Dependency*: This scale is designed to measure an aspect of "overprotection or overpossessiveness." High scores suggest that the parent favors sheltering children from difficulties and disappointments.

2. *Strictness*: High scores on this scale suggest that the respondent favors strict training and firm discipline of children.

3. *Irritability*: High scores suggest that the respondent regards child rearing to be difficult, frustrating, and dissatisfying.

4. *Excluding Outside Influences*: According to Schaefer and Bell this scale is "designed to measure family ethnocentrism and may be related to parental control and authoritarian attitudes." High scores suggest that the parent discourages the child from questioning the opinions and points of view of his parents.

5. *Deification of Parents*: High scores on this scale indicate that the parent encourages his children to revere and respect him above all other people.

6. *Approval of Activity*: High scores on this scale suggest that the parent teaches his children that success comes by working hard and keeping busy. The emphasis is upon activity rather than the gaining of experiences.

7. *Avoidance of Communication*: According to Schaefer and Bell, this scale was written "to determine whether the parent would permit or encourage the child to talk about his anxieties, conflicts,

hostilities, and disagreements with parental policies." High scores suggest that children are discouraged from discussing their problems, fears, and worries.

8. *Intrusiveness*: High scores on this scale indicate that the parent agrees with the concept that children should seldom, if ever, conceal anything from their parents.

9. *Comradeship and Sharing*: Items in this rapport scale are stated to encourage agreement. A high score, unlike high scores on the other nine scales, does not reflect a pathological attitude. The scale reflects a readiness on the part of parents to show an interest in the affairs of their children, to have fun with them, and to participate in their activities.

10. *Acceleration of Development*: High scores on this scale suggest that the parent does not consider readiness an important factor in a child's growth and that he is inclined to "push" the child's development.

In scoring these scales, a value of 4 points is given for a response which indicates strong agreement, 3 points for mild agreement, 2 points for mild disagreement, and 1 point for strong disagreement. A scale score is obtained by finding the sum of the item weights. A high score reflects an attitude in the direction of the title of the scale. For example, a high score on Scale 2, *Strictness*, indicates that the respondent favors firm discipline of children.

Procedure Followed in Making Study

The *Parental Attitude Research Instrument* was administered to parents of fifty children who met the criteria set forth for classification as superior readers and to parents of fifty children who met the criteria for classification as inferior readers. Each group contains twenty-five boys and twenty-five girls who had completed the sixth grade of the Kalamazoo Public Schools. The chief variable considered in the forming of the two groups is that of reading achievement which extends two or more years above grade placement for superior readers and two or more years below grade placement for inferior readers. Average reading scores on the *Stanford Achievement Test* for superior readers range from 8.5

to 11.3. The mean is 9.7. The mean reading grade for inferior readers is 4.0 with a range from 2.9 to 4.5. According to reports from teachers and school authorities, all children selected for consideration in this study are of average intelligence or better. Superior readers range in age from eleven years and one month to twelve years and five months. Their mean chronological age is eleven years and eleven months. Inferior readers range in age from eleven years to thirteen years and have a mean chronological age of exactly twelve years. No child was selected who had known health factors which would impede normal progress in learning to read, and all children are living with both parents. The mean social class index of families of superior readers is 45.5 and for families of inferior readers, 45.6, suggesting that on the average both superior and inferior readers are from the middle class of the general population. All economic and social levels are represented in each group. It is reported that siblings do not differ markedly in reading ability from the children selected for this study.

In this study the mothers of superior readers were compared with the mothers of inferior readers and the fathers of superior readers were compared with the fathers of inferior readers. Mean scores for each group were determined for each of the nine scales making up the *Parental Attitude Research Instrument*. The rapport scale was not scored. Appropriate F and t tests were applied to determine the significance of the difference between compared means.

Summary of Data

Table 1 shows the means of mothers of superior readers and the means of mothers of inferior readers on the nine scales of the *Parental Attitude Research Instrument*. It will be observed that all the scales utilized in this study except Scales 2 and 3 show significant differences at the .01 level.

The mean scores of fathers of superior and inferior readers on the *Parental Attitude Research Instrument* are shown in Table 2. In many respects this table is almost identical to that of Table 1. The attitudes of the fathers of superior readers and the attitudes of the fathers of inferior readers are significantly different except for those measured by Scales 2 and 3.

TABLE 1
Differences Between Mothers of Superior Readers and Mothers
of Inferior Readers as Determined by
the Parental Attitude Research Instrument

Scale Number and Title	Mothers of Superior Readers Mean	Mothers of Inferior Readers Mean	F	t
1. Fostering Dependency	8.54	11.54	2.16	4.90*
2. Strictness	15.38	15.62	1.26	.41
3. Irritability	14.18	15.02	1.47	1.37
4. Excluding Outside Influences	10.06	14.46	1.25	6.41*
5. Deification of Parents	12.26	15.74	1.70	5.55*
6. Approval of Activity	13.14	15.26	1.18	3.53*
7. Avoidance of Communication	8.90	11.58	2.07	3.86*
8. Intrusiveness	9.58	11.82	1.23	3.45*
10. Acceleration of Development	10.54	14.02	1.26	4.94*

*Significant at .01 level.

TABLE 2
Differences Between Fathers of Superior Readers and Fathers
of Inferior Readers as Determined by
the Parental Attitude Research Instrument

Scale Number and Title	Fathers of Superior Readers Mean	Fathers of Inferior Readers Mean	F	t
1. Fostering Dependency	8.26	12.02	1.50	6.44*
2. Strictness	14.74	15.34	1.02	.99
3. Irritability	14.26	14.42	1.55	.26
4. Excluding Outside Influences	11.46	14.06	1.15	3.94*
5. Deification of Parents	13.50	15.58	1.50	2.98*
6. Approval of Activity	12.98	15.22	1.19	3.45*
7. Avoidance of Communication	9.66	12.26	2.06	4.29*
8. Intrusiveness	10.46	12.38	1.03	2.47**
10. Acceleration of Development	11.34	14.66	1.43	5.18*

*Significant at .01 level. **Significant at .05 level.

It has been shown that mothers and fathers of inferior readers express attitudes of intrusiveness to a greater degree than mothers and fathers of superior readers. Their attitudes suggest that they would hasten the development of their children, foster dependency, and approve of activity for activity's sake rather than for the development of worthwhile experiences. They express attitudes which suggest that they would exclude outside influences, discourage the development of communication skills, and exaggerate their own importance in the home. Parents of inferior readers do not express attitudes which favor strictness and irritability to any greater extent than do parents of superior readers.

Inferences and Conclusions

A careful sifting of the facts resulting from this investigation seems to show that parents of superior readers express attitudes which are less dictatorial and are more democratic than parents of inferior readers. Mothers and fathers of superior readers manifest attitudes which foster independence rather than dependence, include outside influences rather than exclude outside influences, place less emphasis upon the deification of parents and more emphasis upon group thinking and group participation. Parents of superior readers convey attitudes which encourage their children to voice their ideas and points of view rather than attitudes which discourage freedom of discussion. Attitudes of these parents suggest that their children can discuss any topic with them without shame, ridicule, or reproach. Furthermore, parents of superior readers manifest attitudes which suggest that they refrain from attempting to hurry the growth and development of their children. Instead, the attitudes of these parents suggest that they appreciate the concept of readiness. Attitudes of parents of superior readers emphasize the value of communication and the development of language skills. Their attitudes suggest that they refrain from restricting their children in ways which retard growth and development. Surely, the way of life manifest by the parents of superior readers differs significantly in these respects from that of parents of inferior readers. Their way of life is more democratic.

It can be assumed that parental attitudes produce differing backgrounds having positive and negative effects upon reading performance. These backgrounds, in turn, result in mental content varying in kind and degree with the parental attitudes producing it. This study suggests that in attempting to develop

effective reading achievement consideration should be given not only to the attitudes of parents and to the creation in the home of an intellectual climate productive of good reading, but to the establishment of adequate mental content on the part of children.

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Is Reading What the Reading Test Tests?

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An old story relates how a stranger in town, with a yen for gambling, was warned that the weekly poker game was not honest. Despite the warning, the stranger sat in on the game and in the natural course of events lost all his money. When asked why he had played in the game knowing that it was not on the "up and up", the man answered, "Well, it's the only game in town." The stranger in this tale is similar to the college reading specialist of today who continues to evaluate his work by using standardized reading tests. The reading specialists know that reading tests are inadequate in many respects, yet they are the only measure available.

Typically advancement in science is accompanied by and implemented through improved measurement techniques. Significantly this conference has devoted considerable attention to the problems of measurement in reading. (2) (6) (8) Yet standardized reading tests have failed to keep abreast with either the needs of research workers or with those of classroom teachers.

Recent trends point to an increasing concern for the development of a more adequate psychology of reading, and some progress seems to be emerging. Recent interest in verbal behavior, and particularly with the acquisition and retention of concepts and their verbal representations, have exciting implications for reading specialists. The resurgence of interest in cognition holds promise for reading teachers who long have recognized the relationship between reading and thinking. The more extensive use of computers has served to free research workers from the drudgery of countless hours of calculation thus enabling them to appraise and evaluate many facets of human behavior. Progress also is apparent in the field of reading itself which holds promise for the development of more adequate theories of reading. Davis's (1) factor analytical research of the forties, the sub-strata factor studies of Holmes and Singer (5) and Smith's (7) neural-transmission model, to mention merely a few, represent valuable studies which could assist in the development of sound theories for reading. However, unlike the recent studies of intelligence by Guilford (4) the work

of Holmes, Smith, and others has had little impact either in the measurement of or instruction in reading.

Examination of reading tests available for the college teacher of reading, in fact, will indicate that there is little difference between the tests widely used today and those of twenty-five years ago. A possible exception is the availability of measures of "flexibility." Rate is still measured in terms of a short passage which the student reads while being timed. Comprehension is checked by multiple-choice questions, and vocabulary typically is appraised by the selection of the proper synonym or short definition. Unfortunately, if one is to judge from the published literature, improvement on such measures is judged by many of us as "scientific evidence" of the value of certain teaching procedures and techniques. Perhaps this last point is the most important for the college reading instructor.

Undoubtedly the typical reading test available today does successfully differentiate among representative groups of college students. Similarly the typical instrument will measure these differences reliably and have a certain predictive validity. Measurement specialists themselves, however, write a great deal about content and concurrent validity. Content validity may be thought of as the degree to which an instrument adequately samples certain types of situations. Concurrent validity, which is sometimes called status validity, pertains to the degree that tests behavior is representative of actual behavior. Reading specialists might well ask themselves, "What relationship does this test have to all of the facets of the reading process which I feel are important and seek to teach?" The answer is obvious: the classroom teacher or the remedial specialist seeks to deal with many dimensions of reading behavior which are not appraised by standardized reading tests.

Recently we conducted a modest "experiment" to determine how students behaved when administered a reading test under modified conditions. A group of upper classmen who normally read timed selections rapidly and well were administered the comprehension part of the *Survey Section of the Diagnostic Reading Test. (Part 3: Comprehension)* (2). This section of the test consists of four reading selections, each with five four-part multiple choice items. Under standardized conditions the testee is told to read each passage and that following the passage he would find questions concerning the main ideas in the passage, important facts

which were given, the order of events, and conclusions which could reasonably be drawn from the ideas presented. The instructions stated that the passages could be reread if needed. Generous time limits are provided.

For the purpose of this study the instructions were paraphrased as follows:

Directions: This test consists of a series of passages on different topics. You are to read each passage and then list the *five* most important ideas and facts which are given, and conclusions you can reasonably draw from the ideas in the passages. You may reread the passage at any time, but you will be able to complete the test more rapidly if you read the test carefully the first time. Do not write on the page with the reading selection; use this special answer sheet.

It should be noted that the type of reading demanded here more closely resembles the type of reading required by the college student in preparing for his daily assignments. He must select what is important and significant, for example, rather than simply recognize a right or wrong answer.

A number of behavioral differences occurred as students undertook the assigned reading. Some students skimmed the entire passage, then read it more slowly, and then wrote their statements. A few read the selection slowly and carefully and wrote until they completed the assignment or ran out of ideas. Others wrote statements for each paragraph they read. All of the students reread the passage at least once and checked their answers with the passage.

An effort was made to compare the content of the students' written responses with the content of the multiple-choice items developed by the test constructor. Obviously such comparisons are not only highly unreliable and subjective, but also time-consuming. Yet certain trends seemed apparent. Generally the students tended to first write very general statements about the topic they read. Secondly many students tended to paraphrase the generalized statements they made. Again many students omitted facts deemed significant by the person writing the standardized test items. Furthermore, there was a tendency for students to elaborate on the central theme or main idea of the passages by making broader generalizations or extending factual information contained in the reading selection. Last, although many of the statements were regarded by those scoring the responses as identical in content, a wide variance in interpretation also was found.

It is recognized of course that this study falls considerably short of minimum standards of research. It was undertaken merely to verify the complexity of reading behavior in the college setting and to illustrate some of the points made in this discussion. It is hoped that many of you will replicate it or undertake a similar study with your own students. This type of experience and others then perhaps will help us to answer the question, "Does the reading test test reading as the classroom teacher or reading specialist sees reading?"

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A Survey of College Reading Programs in Louisiana and Mississippi

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In their annual meeting in October, 1963, the members of the Louisiana-Mississippi Invitational Conference on Reading decided to survey practices used in teaching reading in the schools within the two states. Separate surveys were to be conducted at the elementary, junior high, secondary, and college levels. The purpose of these surveys was to provide the members of the Conference with information concerning the actual status of reading instruction which would enable the Conference to initiate research projects which might prove of value in improving reading instruction in the two states. This paper will discuss the data collected at the college level.

The questionnaire, composed by the college committee of the Conference, was based on a questionnaire used by Lowe (4) in his extensive study of college reading programs in Virginia. Many similar studies have been made. Previous studies reported at the National Reading Conference on this subject were presented by Andrews (1), Causey (2) and Causey (3). Included in this yearbook are detailed reports of programs at several Universities.

Questionnaires were mailed to presidents of predominantly white, state and private institutions of higher learning. Mr. Alvin Lowe of Loyola University of New Orleans collected and collated the information for Louisiana. Mrs. Lillian Hayden of Perkinson Junior College assumed responsibility for the Mississippi junior colleges, while the writer collected data from the senior colleges and universities. Twelve Louisiana colleges, ten Mississippi junior colleges and five Mississippi colleges furnished completed forms. Follow-ups indicated that five junior colleges and five Mississippi colleges who did not respond did not have regular college reading programs and were not interested in developing such programs. Two of the senior colleges had, however, cooperated with personnel from Atlanta, Georgia, who offered the Wood Speed Reading Course.

Section one of the survey consisted of general information and identifying data. Responses are presented in Table 1.

TABLE I
Responses to Section I of Survey

	La.	Miss. J.C.	Miss. Sr.	Total
Position of respondents				
Dean	2	5	1	8
Reading Specialist	3	2	1	6
Education	4	1	2	7
Guidance	1	1		2
President		1		1
English	1			1
Special Education	1			1
Psychology			1	1
Want copy of survey	12	10	5	27
Have a reading program	4	5	3	12

Responses to "What questions do you have concerning the starting and/or improving of a reading program?" were made by ten respondents. The four colleges having reading programs were interested in academic credit and methods of improving their program. Comments of the six who had no program ranged from no need for a program to questions concerning cost, availability of personnel, selection of students and provision for academic credit.

Section II of the survey was answered by those who did not have a reading program. Results are presented in Table II for the fifteen colleges which did not have reading programs.

TABLE II
Responses of Schools Without Reading Programs

	La.	Miss. J.C.	Miss. Sr.	Total
Like to have	6	5	2	13
Contemplating starting	3	4	0	7
Discontinued program	2	1	0	3

Three programs were discontinued for the following reasons:

1. No need because when English classes were "sectioned" it took care of the reading problems.
2. Lack of student interest.
3. Lack of trained personnel to conduct courses.

The information reported by the respondents who offered reading improvement programs is listed below. The first figure indicates the responses of Louisiana colleges, the second the Mississippi junior colleges, and the third the Mississippi senior colleges.

1. Year program established:

1953	0-0-1	1961	0-1-0
1956	0-1-1	1962	1-3-0
1960	2-0-0	1963	1-0-1

2. Department sponsoring:

Education	2-1-1	Special Education	1-0-0
Reading	0-2-1	Psychology	0-0-1
Guidance or			
Student Service	1-1-0	English	0-1-0

3. Academic Credit:

One semester hour	0-4-0
Two quarter hours	0-0-1
Two semester hours	0-0-1
Partial credit for orientation course	1-1-0
None	3-1-1

4. Scheduling:

Hours per week	Length	Number
6	semester	1-0-0
3	semester	0-3-1
3	quarter	0-0-1
3	ten weeks	0-1-0
3	five weeks	0-0-1
3	three weeks	0-1-0
2½	ten weeks	1-0-0
2	varies based	
	on progress	1-0-0
1½	eight weeks	1-0-0

5. Instructors:

Full time	2-3-0	Part time	2-2-3
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6. Training of Instructors:

Ed. D.	1-0-1
Masters in Reading	1-2-0
Others indicated little or no special training in reading.	

7. Number of students in program for year:

0-50	2	0	1
50-100	0	1	0
150-200	1	1	0
200-250	1	3	2

8. Materials used:

Pacers	3-3-1
Rateometer	2
Controlled Readers	5
Shadowscope	2
S.R.A. Accelerator	5
Tachistoscopes	2-2-0
Speed-i-o-scope	1
Keystone	2
Tach X	1
Reading Films	4-2-1
Controlled Readers	5
Iowa Films	1
Perceptoscope	1
Workbooks	2-3-3
Reading for Meaning	1
EDL Word Clues	1
Be a Better Reader	1
McCall-Crabbs	1
PDL Practice Reading Book	2
SRA Reading for Understanding	1
SRA Student Record Book	7
Reading Tests	4-2-3
Gates Survey	1
SRA Diagnostic	1
Gray's Oral	1
Diagnostic Reading Tests	5
PDL Pre-and Post Tests	1
Iowa Advanced Reading	1
Cooperative English Test	2
Nelson Denny	2
SRA Laboratory Test	7

Other Tests	2-1-2
Vision	1
Hearing	1
Abstract Reasoning	1
Stanford Phonics	1
ACT	1
Wide Range Achievement	1
Reading Books	4-3-3
A wide variety of titles were listed	
Other Materials	3-3-2
SRA Labs	7
Cornet Programed Series	1

As indicated by the above responses, there was no consistency in any phase of the college reading programs. There seemed to be a tendency, for the programs directed by trained reading personnel, to use a variety of materials while those without background in reading used less flexible methods and more "packaged programs."

The committee plans to follow-up this survey with a more detailed examination of present programs. The committee also plans to provide assistance to those colleges indicating a desire to initiate programs. The survey has seemed to motivate the colleges toward examining their present programs or investigating possibilities of starting programs.

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Theoretical Aspects of the Cloze Procedure

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Closure and Cloze

Taylor (18) in his doctoral dissertation which introduced the cloze procedure as a technique for the investigation of language phenomena proposed two rationales for the procedure. One was based on the Gestalt concept of closure, the other on ideas of communications theoreticians and engineers and popularly called "information theory." The relationship of Gestalt ideas of closure to the cloze procedure seems a very tenuous one. It is based more or less on the rather obvious observation that there is a gap to be filled in and the equating of the subject's response to this gap with the Gestalt description of the perception of a non-symmetrical, incomplete situation. The true Gestaltist has always concentrated on the perceptual and has invariably considered closure a literal closing. There is no evidence that subjects close, cloze units in this literal fashion. The term "cloze" is misleading as a designation of this procedure primarily because it arouses in the thinker the more common constructs of Gestalt psychology which have always been difficult to apply to verbal situations. In an exhaustive review of the literature concerning closure and the cloze procedure Rankin (14, p. 20) states, "All of this suggests that making cloze responses is primarily a cognitive rather than a perceptual task." Gestalt explanations have not been very successful with cognitive processes.

If one adopts a rather deviant view of closure, deviant at least from the point of view of the Gestaltist, he may think of the restructuring operations of closure as a coding operation. Miller (9, p. 235) argues that, "... when the field theorist talks about 'restructuring' we can often substitute the word 'recoding.'" Cloze lends itself very well to a description as a coding operation. Furthermore if one defines closure in this manner many of the constructs of information theory are available to aid in the analysis. By defining closure in some probabilistic fashion (e.g. using informational analogies) our descriptions are improved and experimental testing becomes more feasible.

Language Organizations and Their Components

It should be noted at the outset that the operations which a subject performs in completing cloze units go beyond those phenomena investigated in communications engineering. Informational analysis for the communications engineer involves only the statistical rarity of signs. The human communicator is certainly using signs but in a manner that goes far beyond their probabilities of occurrence. It is well to keep in mind from the beginning that the cloze procedure is related not only to language but also to thought, and I, for one, assume no simple relationship between language and thought.

I have always found it impossible to attempt to analyze the cloze procedure without having in mind some concept of how language operates in general. The concept of language in the background of this paper is that language is generated from a pre-established "plan." By "plan" I have in mind Miller's et. al. (10, p. 16) concept of "... any hierarchical process in the organism that can control the order in which a sequence of operations is to be performed." The plan for a specific language is learned, but I assume many genetically based elements in the organization of the human nervous system which make language possible—otherwise one could teach an ape to speak. There is a plan for generating language, or as I say here, encoding; there is another plan for interpreting language input—decoding. The plans for encoding and decoding may have many similarities, but there are also basic differences. For example, Miller, Pribram, and Galanter (10, p. 145) writing of such plans for speaking remark, "The plan of the sentence, it seems, must be determined in a general way before it is differentiated into the particular words that we are going to utter." Evidence from the use of the cloze procedure suggests, however, that plans for interpretation of speech operate over very small segments of the text—four or five words on each side of a particular deletion—and thus must proceed from the particular to the general (8).

My idea of decoding plans is that they proceed sequentially, yet at each language unit in the sequence there is a parallel process going on. Perhaps a rather simple table will make clearer what I am saying. Assuming that the planning process is word by word (which is unlikely) one might represent a particular sentence as follows:

Table 1. (11)

1	2	3	4	5
Don	Brought	His	Black	Bread
He	Has	More	Cheap	Sheep
Red	Left	No	Good	Shoes
Slim	Loves	Some	Wet	Socks
Who	Took	The	Wrong	Things

The planned sequence is 1, 2, 3, 4, 5. Our subject is presented with a sentence to read: "Red has more good shoes." These words are in storage with other words, but they are related by many kinds of categories. Here we are considering only the grammatical category. I assume that reading for the practiced reader is a maximum-cue, over-practiced recognition routine. There is little uncertainty involved in this situation. Reading reaction times are very rapid, only slightly slower than disjunctive reactions. If one examines intonation patterns for pauses (pauses have been shown to be related to points of high information) he finds only very short pauses typical of the task of phoneme production and phrase integration during reading.

The cloze procedure disrupts this decoding process with an instruction for a decision process requiring more or less elaborate search procedures by the organism—at least more elaborate than the ongoing recognition process. There seems to be a shift from some sort of matching process to some sort of search procedure. One might represent this change on Table 1 (presented previously) by leaving out the underline in the second position for example. The subject now has no direct cue to the language element which should occupy this space in his plan. I submit he must search for it, that is to say he must survey certain categories of language elements for the most probable one, and the products of his searching will give the experimenter cues to his language processes. At one point in the processing of language materials, then, our subject is reading; at another point he is producing a word to fit a certain context. The procedures relevant to decoding are appropriate on the one hand, and the procedures relevant to encoding on the other. The cloze procedure enlists the subject in an hierarchical process which goes beyond the ordinary demands of reading.

I am viewing the cloze procedure as a phenomenon related to the production of components to fit a language organization. The

implications of modern grammars such as the structural grammar of Fries (3) and the generative grammar of Chomsky (2) assume, at least implicitly, a language process moving in at least two dimensions—a sequence, moving in English from left to right, or from first to last in time; and a “choice” structure moving perpendicularly at every language unit in the sequence. Goldman-Eisler (4) has demonstrated that pauses in sentences indicate a consistent expanding and contracting of information over the sentence, and I have shown this phenomenon using Shepard’s “word-guessing” technique, which I consider a variation on the cloze procedure. Here are the data, for example, from six subjects per word who were instructed to “guess all the different words you can think of which ‘make sense’ in the empty blank in this sentence.” The subjects were given five minutes to produce words.

These data indicate the size of the vertical distribution when the sequential and semantic constraints of the sentence are involved. Note that the same constraint is not operating when the context is only on one side of the gap in the text. Constraints of the unilateral text computed on the left side of the cloze unit, then independently on the right side of the cloze unit sum to an amount very close to the bilateral constraint. This is one argument for the position that the sentence to be encoded is planned as an entity, not bit by bit. Notice that in the bilateral condition (context on either side of the cloze unit) there is a movement from a large number of “types,” to a small number of “types,” back to a large number of “types,” etc. I have shown this same effect in sentence sizes from 6 to 18 words. Generally, words at the points of low information are structural words, and words at the points of high information are lexical words. One possible explanation is that structural words form restricted, short categories and thus are rapidly exhausted, while lexical words form long, practically inexhaustible categories.

The cloze procedure, then, does not always produce the same type distribution. Rankin (15) adapted the cloze procedure to Fries’ division of language into structural and lexical elements. Incidentally this is one of the most used divisions in studies using the cloze procedure and Rankin is rarely credited with this important and original distinction. The structural deletion is, of course, confounded with the lexical because of the usual method used in forming the structural cloze. I think of both structural and lexical deletions as a removing of a member of a category. This is the

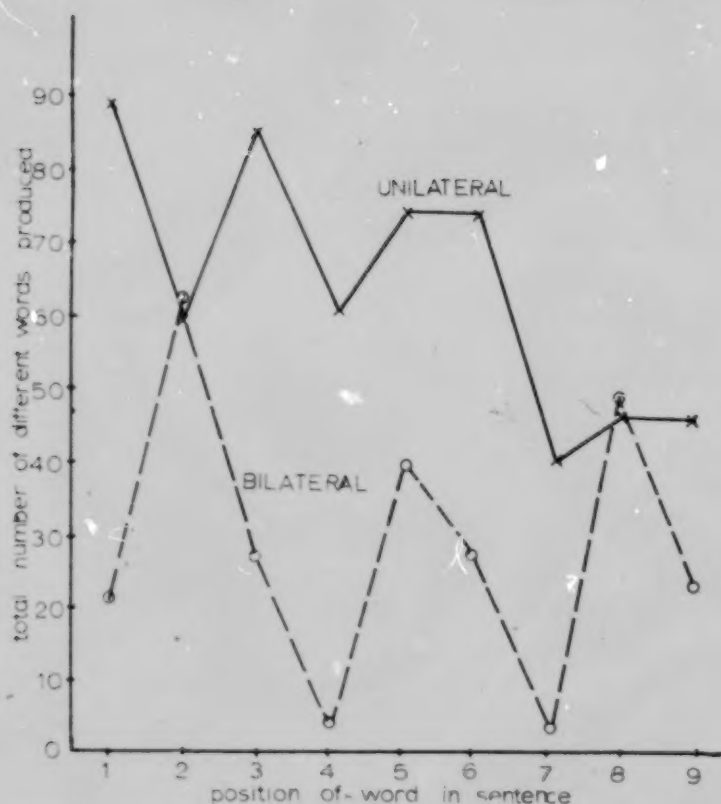


Figure 1. Decrease in constraint from the bilateral to the unilateral situation.

whole implication of applying informational measures to the words filled in cloze units. The implicit assumption is that at this particular point in a language passage there is a distribution from which a particular language element is to be selected. The size of this distribution is the measurement we are seeking.

Further support for a dichotomizing of language into structural and lexical categories has come from certain studies of aphasia. Jones and Wepman (7) in their classification of aphasias according to the nature of the speech difficulty have designated a "syntactic" aphasia and a "semantic" aphasia. Some forty per cent of a sample of over one hundred patients exhibited syntactic aphasia; over fifty per cent of another sample of 168 aphasics exhibited semantic

aphasia. Syntactic aphasia is characterized by the misuse, or more often, the omission of function words and grammatical inflections. Speech tends to be telegraphic and little of its melody is retained. Many substantive words are retained, and certain well practiced phrases and short routine sentences are available. The following is a sample of the speech of a syntactic aphasic:

"Cards . . . It's a 'cards' . . . four men . . . game . . . money
table . . . money and cigarettes . . . everything . . . fun cards.
That's all . . . cards money . . . fun."

The semantic aphasic on the other hand has great difficulty with substantives (except the most frequent and general). Long pauses are often found when the aphasic is trying to recall such words. They retain the use of function words and often retain highly frequent substantives also. To a large extent they maintain the sequential characteristics of speech-flow, melody, pitch changes, and grammatical structure. A sample of the speech of a semantic aphasic follows:

"Well, I would say . . . ah . . . prak . . . ah . . . parkenkawr . . .
dray men are spey. They are the ticks and the ticks . . . five
tars . . . in that what I'm wrong."

Structural and Lexical Differences

While there are both syntactic and semantic constraints affecting both structural and lexical language elements there is a high degree of correlation between the structural and the syntactic and the lexical and the semantic. This may be illustrated using diagrams of the type used in generative grammars. Let us consider this sentence presented to subjects with only itself as context:

"They _____ going to town."

In a sample of individuals asked to fill in this blank with all the possible words which would fit it, every individual included the word "are." The next most common word was "were." Eighty per cent of the words given followed the structural pattern shown in figure 2.

The constraint for these subjects was primarily the constraint of syntactic agreement. With this amount of context few subjects saw the possibility of using "going" as a direct object and shifting the word in the second slot from an auxiliary to a main verb.

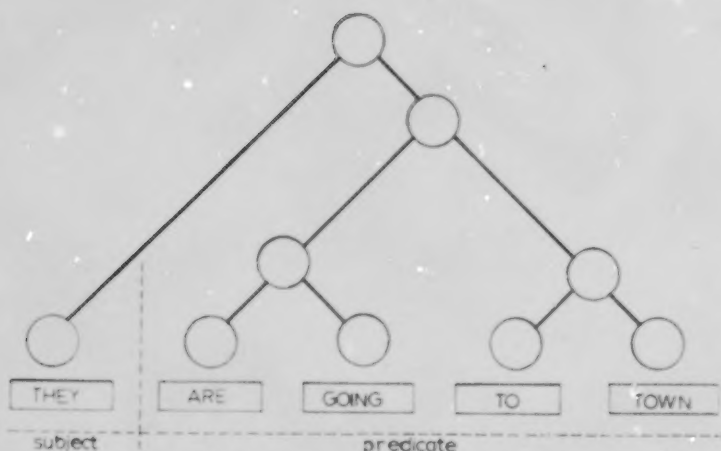


FIG. 2. DIAGRAM OF SENTENCE WITH AUXILIARY AND VERB.

Now consider this increased context:

"The young boys went downtown their first day in the new town. They were chased home by a gang of roughnecks — rock-throwing roughnecks. The next day they tried again, the same thing happened, and again the next day. They _____ going to town."

The most frequent word with which the subjects now filled in the blank was "stopped." The next most frequent word was "quit." The sentence was restructured by the subjects as follows:

The auxiliary has practically disappeared; in fact, in only eight per cent of the responses is any type of primarily structural element inserted in the blank. With the constraining context, the subjects have now retrieved words which are congruent with the semantics of the situation.

The rate of production of words is much faster with the increased context, in this case, than it is without the context. This is contradictory to Shepard's (17) finding that constraint varies directly with the amount of context. It is true that when random language passages are used the size of the distribution of subjects' guesses decreases with the amount of context. In this situation, however, one must consider the size of the category to be searched. An examination of our figure 2 indicates here that the constraint in this situation is imposed by the main verb. Most subjects select a plan to supply an auxiliary. They are thus selecting from a

relatively small distribution, i.e. the distribution of auxiliaries. Even though the sentence without other context gives a wide latitude for meaning, most subjects become entangled with a plan to supply the grammatically correct auxiliary.

In the condition represented by figure 3 the semantic constraints pattern the choice of a plan and the search for a main verb is the obvious strategy. The category of main verbs is much larger than the category of auxiliaries. With the additional context the auxiliary has been rejected as a candidate for filling in the cloze unit because it has little probability in the light of the semantic structure of the context.

Structural elements in the language are ordinarily short, very high frequency units. Zipf (23) some years ago demonstrated that when the rank order of a word is plotted against the frequency of the word on a logarithmic scale the result is an exponential curve with a slope of -1 . Miller (9) says of this formula that it explains too much to be completely false and too little to be completely true. It may be that parts of the language act requires an ergodic, stochastic process while other parts require planned, teleologic processes. The operation of this type system might be to run off a highly probable, i.e. highly redundant, matrix in which to embed low-redundant elements retrieved from a relatively independent system. In this system the function words might

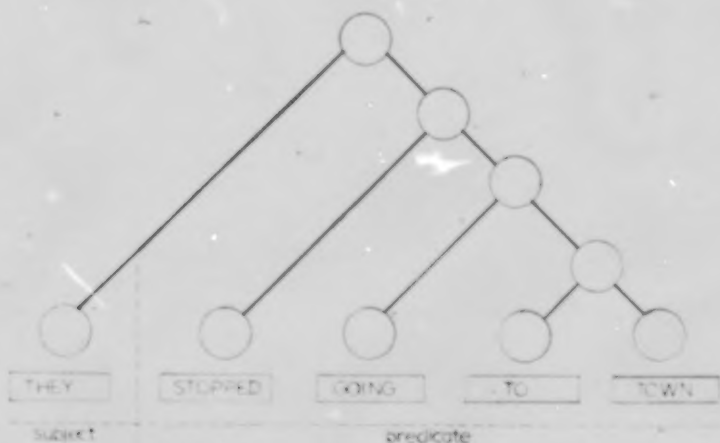


FIG. 3. DIAGRAM OF SENTENCE WITH VERB AND OBJECT.

be expected to distribute stochastically; the lexical elements would not exhibit this characteristic. The Zipf data lends some credence to this idea.

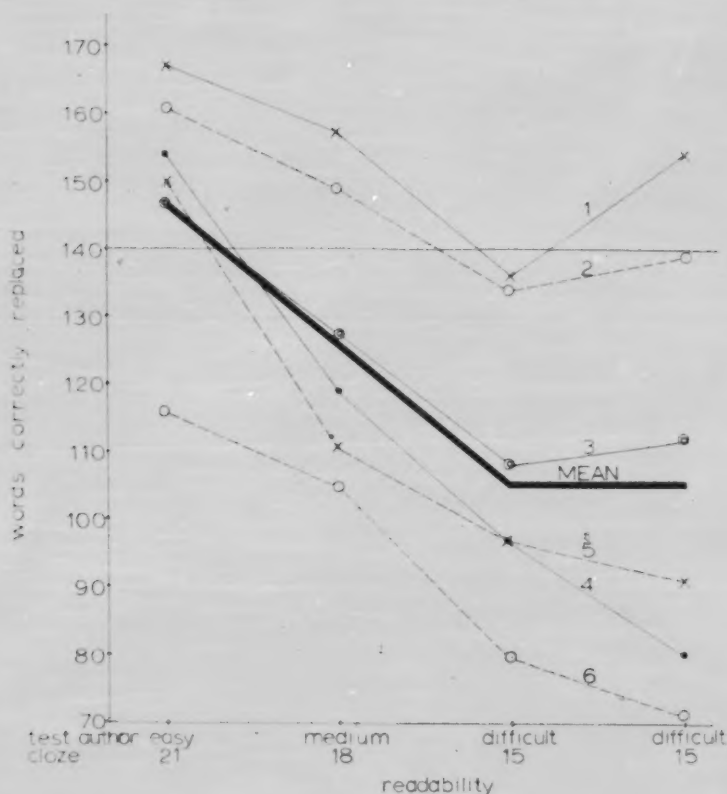
It is my conception that the structural elements in the language are not stored in the same sense that lexical elements of the language are stored. The structure of the language appears to me as primarily for encoding. It thus forms a matrix within the language producer, very closely correlated with the matrix in other language producers—this is one of the things we mean by the high frequency of structural elements—but nevertheless this matrix is not transmitted from encoder to decoder.

The same system could be used to strip redundancy from input language. As the very frequent language structure matches with the language input from the external environment, only the discrepancies, the uncertainties in the incoming message, require further processing. This is a common principle of communication theory. Storage of such frequent elements coming from the external environment would be extremely inefficient and would seem to greatly overload the capacity of the organism. I have commented before that this idea of the effect of structure on decoding seems to fit the hypothesis of Barlow concerning the serial reduction of redundancy (20). If our idea of permanent memory is anywhere near correct, entire language units are not stored; they are recoded (chunked). I have shown that function words in the recall of stories and scientific material conform more closely to the distributions of function words in the individual's spontaneous production than they do to the distribution of function words in the original materials. Lexical elements, on the other hand, conform very closely to the lexical elements in the original materials. I have also investigated the effect of function word position on rate. Using the technique of Pierce and Karlin (13) and lists of prepositional phrases and their reversals (e.g. phrases of the type "of the dog," as opposed to phrases of the type "the dog of") it may be demonstrated that prepositional phrases are read significantly faster when information, frequency of component words, number of syllables, and familiarity are controlled. I assume this to mean that words following the structural units are "expected" to require interpretation or storage. Structural elements give cues to the proper process. When these expectations are violated, longer latencies are evidenced.

Lexical deletions using the cloze procedure involve the language units designated by traditional grammars as nouns, main verbs, sometimes adjectives, and more rarely adverbs. If we have subjects guess all the words which will "make sense" at these particular loci, we get long lists of words, so long in fact that if the adjustment of both experimenter and subject is to be preserved, a time limit is imposed and the extent of the list estimated by the rate of production.

Taylor (19) the originator of the cloze procedure conducted a study in which he deleted words according to an "any" or "hard" procedure which corresponds to our present dichotomy of structural-lexical, respectively. Structural cloze was correlated significantly closer to the *Air Force Qualification Test* than lexical cloze, but lexical cloze was a significantly better predictor of achievement. Taylor also noted that structural cloze was a better measure of readability. I became interested in the theoretical implications of this finding. I divided two forms of the *Davis Reading Test* into four equal segments and made up structural and lexical deletions of alternate paragraphs (every 10th word) in each of the four groups of four sections. I assumed that the test authors had arranged the material within the sections on some difficulty scale and the Flesch and Dale-Chall formulas confirmed this. I then gave another form of the *Davis Reading Test* to all the subjects who completed the cloze blanks. The results appear in figure 4.

When the structural deletion scores for the entire group are used there is an indication of a gradual increase in difficulty of the material. The subjects who determine this effect, however, are the subjects who score lowest on the reading test. Generally, the poorer the subject on the reading comprehension test, the more efficient he is as a measure of readability. I take this to imply that readability as measured by the cloze procedure is measured primarily through lack of redundancy reducing capabilities of the subjects. Since this redundancy reducing capacity is easy by every developmental standard, and, if Shannon's (16) calculations are correct, tends even for the best redundancy reducers to approach a limit somewhere between 50 and 75 per cent redundancy, one would expect only the most inefficient performers to exhibit great deficiency in it. In fact, one of the great mysteries of language is just this—that its structural elements are acquired so early and so easily that as Carterette (1) shows the fifth grade reader has



Davis Reading Ability Raw Score: 1. 60-69. 2. 50-59. 3. 40-49. 4. 30-39. 5. 20-29. 6. 10-19.

Figure 4. Readability Measures vs. Davis Reading Test Raw Scores.

already attained the redundancy characteristics of "average" adult prose though its lexical elements show no such maturity.

When we look at the results of the lexical deletions in the same study another difference in structural and lexical distributions is evident.

The reproductions of these lexical units from materials of varying difficulty do not give us consistent measurements of this difficulty. In fact, the lexical deletions actually reduce the efficiency of structural cloze as a readability measure. There is certainly no sim-

ple relationship between the two deletions. I take it that a "correct" response to lexical cloze units depends to a great extent upon the semantic constraints of the context. The completion of lexical units is tied in, therefore, to the cognitive and affective systems of the organism. A proper interpretation then must involve some

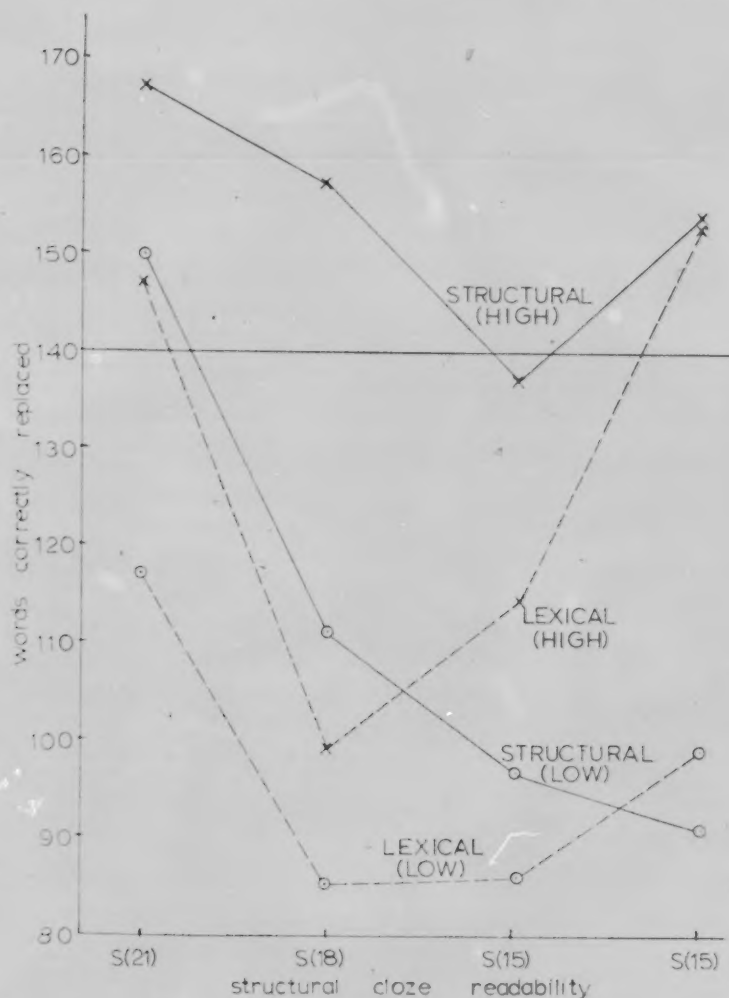


Figure 5. Lexical and structural deletions of subjects with high and low reading ability on a structural difficulty scale.

understanding of the formation and retention of concepts, problem-solving strategies, categorization, and heuristically organized retrieval schemes. This is nothing less than a rather complete psychology of language and thought so for now we will follow the technique of the heroine of *Gone With the Wind* and, "think about that tomorrow."

Seeking and Finding

I have never thought of the cloze procedure as anything other than a search procedure. Perhaps it's just the contiguity of working as a computer programmer and writing a dissertation on the cloze procedure during the same period of time, but I am convinced that it is more than that coincidence. The data have demonstrated time and time again that subjects act as if variable numbers of words are available at various points in a sentence. The longer the list of words which these subjects emit, the longer period of time it takes other subjects to supply a word to fill the same blank, if we run those subjects against time. Taylor (18) demonstrated that the single guess predictability of a word in a bilaterally distributed context is correlated $-.87$ with a probability measure of the distribution of all the subjects' responses. The more frequently subjects correctly filled in a cloze unit, the smaller the size of the distribution at that particular unit, i.e. the fewer word types.

Goldman-Eisler (5) deleted sentences at points which had previously been shown to have high hesitation pauses and low hesitation pauses and instructed subjects that they were to read the sentences aloud and substitute for the blanks words most suitable to the context. She demonstrated that the amount of information which a word contains (information computed by the Shannon letter-guessing technique) is related directly to the length of the pause before the reader fills in the blanks; the shortest hesitations occur when the words contain the least amount of information.

Claude Shannon's (16) original estimate of the redundancy of English was made by having subjects guess which letter of the alphabet (including the printer's space) came next in some meaningful language series. Shepard (17) has demonstrated that a technique of having subjects guess, for a five-minute period, all the words which will "make sense" in a deleted unit will produce a measure of information based on *rate* of responding closely approximating the Shannon results. This study assumes that words

are obtainable from single categories, e.g. famous artists, in such a manner that the rate will decline regularly from time period to time period as the category is exhausted. The assumptions also imply that any one element must be searched out from the total list of elements and that the length of the search will depend upon the number of elements involved in the category.

Other investigators using methods not directly related to the cloze procedure and its variations have assumed that some form of search procedure best characterizes the data on retrieval of information. Yntema (12), studying search processes, begins with a finding of Broadbent that when lists of two different digits presented to the ears simultaneously (one digit in one ear, another digit in the other) are recalled by the subject they are recalled by side of the head to which the digits are presented, i.e. all digits presented to the left ear are reported, then all digits presented to the right ear. If a subject is required to report digits pair by pair—the first two digits, then the second pair, then the third—he makes more mistakes. Yntema arranges materials in the following fashion:

NO CROSSINGS		ONE CROSSING		TWO CROSSINGS	
L	R	L	R	L	R
bet	7	3	part	0	good
sage	1	worse	8	roam	2
jack	4	house	6	5	coil

There were three conditions for the subjects. First, reporting by simultaneous pairs—for the no crossings condition, for example, this would mean reporting bet, 7; sage, 1; jack, 4. Next reporting by ears—for the no crossing condition this would mean reporting bet, sage, jack; 7, 1, 4. Finally, reporting by type of material—for the one crossing condition this would be 3, 8, 6; part, worse, house.

If the task is really a search problem, retrieval by type of material should be about as easy as retrieval by ears. The crossings are organized in such a fashion that a list with no crossing should be particularly easy for the subject to handle when he is instructed to report by ears or by type of material if a search procedure is involved. A search organized in this way would be organized on two redundant principles, that is, whether the items are words or digits, and whether they are heard on the left or on the right. Both of these criteria are met by the data as illustrated in figure 6.

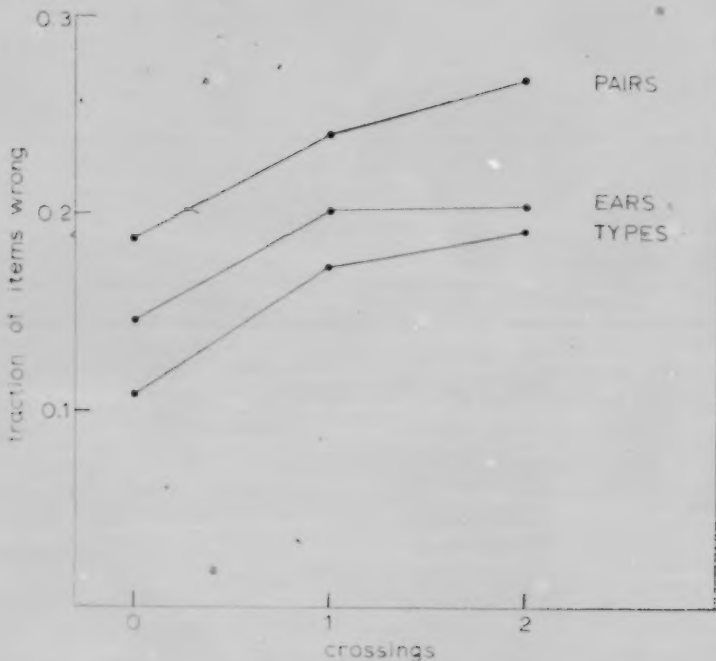


Figure 6. Errors in recall of different stimuli presented to the ears simultaneously.

From Yntema, Douwe B., "Recall as a Form of Data-Processing," paper read at Psychology Section of American Association for the Advancement of Science, Philadelphia, December 29, 1962.

Retrieval by types is the easiest of the three tasks and the difficulty increases with the number of crossings.

There have been several attempts to stimulate storage and retrieval processes, and from some of these attempts have come estimates of the efficiency of search procedures to simulate human verbal behavior in certain selected tasks. An example of such attempts is one by Hunt (6). Hunt programed a digital computer to simulate a "keeping-track of verbal categories" task. The results of the computer program were correlated over all the psychological conditions which had been previously investigated by Yntema and Mueser (22) using human subjects. There was a correlation of .80 between the "search-type" program of Hunt and the data of Yntema and Mueser.

In many of the studies of searching procedures, and invariably in studies using the cloze procedure, the search has been considered as some sort of logical, exhaustive process. This assumption is almost certainly *not* true of human search procedures. It is easy to show that exhaustive search procedures would be much more time consuming than any human being could afford, and the illogicalness of many of our search efforts is obvious. That the human organism's searching is planned in some heuristic fashion seems much closer to the evidence. Contrary to Dewey's ideas, in such complex tasks as problem-solving the array of solutions to the problem are not lined up and then the most probable solution chosen by some logical procedure. For example, Newell, Shaw, and Simon (12) considered the set of all possible sequences of expressions in propositional logic which might have occurred in the second chapter of Whitehead and Russell's *Principia Mathematica*. Using computers to generate all the possible sequences it would take hundreds of thousands of years to compute all the results. By operating heuristically the problem solver always runs the risk he will discard the correct solution along with the millions of irrelevant ones. On the other hand, given the astronomical combinations and permutations of things, human processing systems perform remarkable tasks. Most of our speculations concerning search procedures in this paper have assumed a logically exhaustive process. It is obvious, however, that we consider the psychological data that this can only be a first approximation to the situation in reality.

Summary

The sequential nature of language in its external display is so obvious that we have rarely considered that language production and interpretation within the central nervous system may not be, indeed probably is not, in the same form. If input language sequences were maintained intact, for example, there is no apparent reason they could not be reproduced intact—yet ordinarily they cannot be. Also, if input language sequences were maintained intact, it is difficult to see how individual language “styles” could develop. We know that long messages, beyond eight or nine digits and beyond twenty-five words or so, ordinarily cannot remain intact because they exceed the capacity of immediate memory, and of necessity must be processed as parts of the sequence.

Reading involves different levels of processing of this sequence. It may proceed at a very superficial level in relation to meaning.

One can read, i.e. transduce, pages without getting any meaning from them as almost any reader who has tried to read under conditions of great fatigue or anxiety can testify. At another level reading may offer no problems of interpretation. The reader is entirely familiar with the sequence and the vocabulary. He is simply matching internally distributed signs with the external elaboration. At still another level the sign system represented by the external reading display finds no ready correlates in the organism, or as in the case of the cloze procedure there are gaps in the external display which the organism must supply from his store of rules and signs of the language.

The cloze procedure spreads before the subject a language sequence in a relatively normal form. At some points in the sequence, however, rather than a sign to recognize and match, there is a gap in the sequence. Where most reading input supplies a certain, direct cue to the matching mechanisms of the organism, the cloze procedure requires an analysis, a search, of a distribution of probable elements in order to arrive at a "most likely" one in the light of the reduced cues which are presented.

The implications of the cloze procedure go far beyond its use as a measurement device. In the midst of a subject's decoding operations, it imposes a precise productive operation. Because of the constraints involved it enables us to get a close-up view of what is occurring at particular points in a language passage. Certainly it is true that this view may be distorted by the eccentricity of the task imposed on the subject, but this is true of practically all laboratory techniques. The cloze procedure opens up for us the opportunity to examine syntactic and semantic effects of context on particular language units. We are on the way toward developing differentials between the syntactic and the semantic, using the cloze procedure—if finally realized this would be a major methodological advance. The potential of the cloze procedure has been widely recognized in such diverse areas as those of reading comprehension, achievement testing, aptitude testing, classification of brain injury, readability studies, and studies of suicide. I hope to make the point here that the cloze procedure and its variations carry major theoretical implications for a psychology of language and thought.

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The Cloze Procedure—A Survey of Research

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Since the cloze procedure was developed in 1953 by Wilson Taylor, a considerable amount of research has been done utilizing this valuable technique for a variety of purposes. This paper will cite all the research (known to the author) which has been carried out up to the present time either on the cloze procedure as a central topic or on some other problem through use of this technique. In conducting this survey the author has relied mainly on the *Psychological Abstracts* and the bibliographies of numerous research studies. It is altogether possible, and even probable, that some important sources have been omitted. Of course, no attempt has been made to give a complete account of all the findings of each investigation cited in this brief survey.

In this paper, research on the cloze procedure will be considered first in relation to its use as a measuring instrument and second in relation to its use as a teaching device.

The Cloze Procedure as a Measuring Instrument

This technique has been used to study the communication process both from the standpoint of message characteristics and consumers of messages (i.e., readers and listeners). We shall now consider research in both of these general areas.

The Measurement of Readability¹

A Note on Terminology.—In the remainder of this paper, references will be made to pre-cloze tests and post-cloze tests and to various types of deletions such as "noun-verb" or "any-word." The significance of these designations will be discussed in the section on *Methodological Considerations*. However, for the present, the reader should understand the meaning of these terms. The term "pre-cloze" test refers to a cloze test which is taken either before (or without) reading the original unmutilated article. The "post-cloze" test is taken after reading the unmutilated article upon which the test is based. Various types of deletions refer to

¹Within each section of this paper, studies will be listed in chronological order. Alphabetical order by last name of author is used when two or more papers have the same date.

the grammatical forms of words that are deleted. An "any-word" deletion, for example, refers to a cloze test formed by deleting words without regard to grammatical form.

Studies of Readability.—Taylor (34) ranked several passages by Flesch and Dale-Chall readability formulae and by total pre-cloze, any-word deletion scores. He found the passages ranked the same by each method. However, when he used obviously difficult passages by James Joyce and Gertrude Stein and carried out the same comparison, he found them to be rated as "easy" by the readability formulae, but the cloze ranking placed them as the most difficult of all the passages studied. It seems then that on typical passages, the cloze procedure ranks materials similarly to the readability formulae, but by measuring the similarity between the language habits of writers and particular groups of readers it is able to measure relative readability on certain types of materials which cannot be accurately evaluated by "element counting" formulae.

Limited evidence points to the use of the cloze procedure in the measurement of readability in foreign languages. Taylor (36) found a close correspondence between pre-cloze, any-word deletion rankings and the predicted difficulty of three messages in the Korean language and Sukeyori (33) obtained a rho of .83 between pre-cloze, any-word deletion rankings and judges' ratings of 8 passages in the Japanese language.

Bormuth (2, 3) has carried out a very intensive investigation of the cloze procedure as a measure of readability. After carefully establishing the validity of 9 pre-cloze, any-word deletion tests as measures of comprehension, he ranked the articles for difficulty by both cloze scores and multiple-choice criterion tests covering the same material. He obtained a correlation of .92 between cloze and multiple-choice rankings. The reliability of the cloze rankings was very high as indicated by almost perfect correlations between rankings of the same material at three different elementary school grade levels.

Available evidence points to a high degree of validity for the cloze procedure as a measure of the relative readability of different passages for specific groups of readers. It would be useful if a means could be devised to use this technique to evaluate the readability of one particular passage without reference to other passages such as now can be done by readability formulae.

The Measurement of Reading Skills

General Reading Achievement.—The term "general reading achievement" refers to reading skill as measured by standardized reading tests. Correlations between cloze tests and standardized reading tests establish the concurrent validity of cloze tests as measures of general reading achievement.

Rankin (23, 24) correlated a pre-cloze, any-word deletion test with the *Diagnostic Reading Test-Survey Section*. He obtained correlations of .29 with Story Comprehension, .68 with Vocabulary, and .60 with Paragraph Comprehension. Correlations between a pre-cloze, noun-verb deletion test and the *DRT* test (corrected for attenuation)¹ were .57 with Story Comprehension, .42 with Vocabulary, and .39 with Paragraph Comprehension. Correlations between a post-cloze, noun-verb deletion test and the *DRT* test (corrected for attenuation) were .65 with Story Comprehension, .45 with Vocabulary, and .59 with Paragraph Comprehension.

Jenkinson (19) correlated a pre-cloze, any-word deletion test with the *Cooperative Reading Test, C-2*. She obtained correlations of .78 with Vocabulary and .73 with Level of Comprehension. Fletcher (13) also correlated a pre-cloze, any-word deletion test with the *Cooperative Reading Test, C-2*. His correlations were .63 with Vocabulary, .55 with Level of Comprehension, and .57 with Speed of Comprehension. Fletcher obtained a correlation of .59 between a pre-cloze, any-word deletion test and the Rate of Comprehension sub-tests of the *Deorak-Van Wageningen Diagnostic Examination of Silent Reading Abilities*. Ruddell (29) obtained correlations ranging from .61 to .74 between several pre-cloze, any-word deletion tests and the Paragraph Meaning sub-test of the *Stanford Achievement Test*. Unlike all other investigations, Weaver and Kingston (40) found low correlations between cloze tests and a standardized reading test. These correlations between four cloze tests and the total raw score of the *Davis Reading Test* were .21 and .36 for two pre-cloze, noun-verb deletion tests and .25 and .51 for two pre-cloze, any-word deletion tests. Friedman (14) correlated 20 pre-cloze, any-word deletion tests with the Reading Section of the *Metropolitan Achievement Test*. Her correlations ranged from .63 to .85 with Vocabulary and from .71 to .87 with the total score. Greene (16) correlated cloze tests with the Total Comprehension score of the *Diagnostic Reading Test-Survey Sec-*

¹Rankin's correlations were corrected for attenuation because low cloze test reliability masked the "true" relationship.

tion. His correlations were .51 with a post-cloze, any-word deletion test and .67 with a post-cloze, noun-verb-adjective-adverb deletion "modified" test (to be discussed later). Hafner (17) obtained a correlation of .56 between the *Michigan Vocabulary Profile Test* and a pre-cloze, any-word deletion test.

In summary, with the exception of the Weaver and Kingston study, all other comparisons between cloze tests and standardized reading tests have yielded substantial correlations even though the cloze tests were based upon a variety of different types of reading materials and were constructed and administered in different ways.

Specific Reading Comprehension.—The concurrent validity of the cloze procedure as a measure of specific reading comprehension is determined by correlating cloze test results with scores on comprehension tests covering the same material as the cloze test. Taylor (38) got a .80 correlation between a post-cloze, any-word deletion test and a comprehension test. Rankin (23, 24) obtained a correlation of .78 (corrected for attenuation) between a post-cloze, noun-verb deletion test and a criterion test. Jenkinson (19) found a correlation of .82 between a pre-cloze, any-word deletion test and a comprehension test. Bormuth (2) correlated 9 pre-cloze, any-word deletion tests with criterion tests and found correlations ranging from .73 to .84. The correlation between combined cloze tests and comprehension tests was .93 (1.00 corrected for attenuation). In addition, he found the cloze tests to be influenced by the same variables (i.e., educational level of readers, difficulty of materials, and subject matter) as the criterion tests. He also found substantial correlations between cloze test results and each of 9 different aspects of comprehension measured by his criterion tests. Friedman (14) found correlations ranging from .90 to .91 between total errors on 20 pre-cloze, any-word deletion tests and errors on 20 comprehension tests. However, when she computed correlations between individual cloze tests and individual comprehension tests covering the same articles, her correlations only ranged from .24 to .43. This unusual finding was attributed to special characteristics of the foreign students used in this investigation.

In summary, the cloze procedure appears to be a highly valid measure of the specific comprehension of a particular message. In fact, it is a more accurate measure of specific comprehension than of general reading skill as measured by standardized reading tests.

Reading Gain.—The term "reading gain" is used in this paper to designate the amount of information learned through the "process" of reading as contrasted with the amount of information known by the reader after reading a message. The usual manner of measuring comprehension is to measure reading as a "product" by asking the reader questions after he has finished reading. Of course, as we all know, different readers approach a given article with various amounts of pre-reading knowledge, so that two individuals might complete an article with an equal amount of knowledge concerning the article but one of them might have learned a good deal more during the reading process. In order to measure "reading gain," we need to measure the difference between a pre-reading test and a post-reading test covering the article in question. The cloze procedure lends itself to this type of measurement, although, as we shall see, there are certain difficulties involved in this procedure.

There is evidence that the cloze procedure can measure pre-reading knowledge. Taylor (38) obtained a correlation of .92 between a pre-cloze, noun-verb-adverb deletion test and a pre-reading knowledge test taken before reading the article covered by both tests. Rankin (23, 24) allowed a week's interval between the administration of a cloze test and a pre-knowledge test in order to reduce the effects of learning while taking the cloze test upon performance on the pre-reading knowledge test. The correlation between the pre-cloze, noun-verb deletion test and the criterion test was .86 (corrected for attenuation).

There also is evidence for the validity of the cloze procedure as a measure of post-reading knowledge. Taylor (38) found a correlation of .80 between a post-cloze, noun-verb-adverb deletion test and an immediate recall test, and Rankin's (23, 24) correlation between a post-cloze, noun-verb deletion test and a post-reading criterion test was .78 (corrected for attenuation).

Finally, both Taylor (38) and Rankin (23, 24) found gains between pre- and post-reading cloze tests which were significant at $p < .001$. Greene (16), however, failed to get significant differences between pre- and post-reading cloze tests taken by different subjects. Unfortunately, the two groups of subjects were not equated on the basis of reading ability. Inasmuch as three independent investigations (35, 38, 23) have found that reading the original unmutilated article clearly influences post-cloze test

results (Taylor (35) found delayed recall effects over a six week period), Greene's negative finding is highly questionable.

Upon the basis of most of the available evidence, it appears that the cloze procedure can be used to measure reading gain. This can easily be done for purposes of group comparisons. For the study of individuals, there are two sources of difficulty which may limit the usefulness of this technique. First, unless regression effects are taken into account, a spurious negative correlation may be found between gain and initial status on the pre-test. Second, some evidence has been found by Rankin (26) that pre-cloze test results (but not post-cloze test results) are less reliable and valid for introverts than for extroverts. As Rankin (26, 27) has shown, however, this is not an inherent characteristic of pre-cloze tests, but may be a characteristic of standardized reading tests in general. It is to the credit of the cloze procedure that post-cloze measurements do not appear to have this limitation.

Reading Diagnosis.—Jenkinson (19) has used the cloze procedure in a unique manner which reveals the potentialities of this technique as a diagnostic instrument. She administered cloze tests to high school students and selected high and low scorers for individual interviews. In the interviews she gave them another cloze test and asked each subject to verbalize his reasons for the insertion of words in each blank space. An analysis of these verbalizations revealed many interesting differences between the two groups. This procedure commends itself for diagnosis in the reading clinic.

Validity.—Most evidence on the validity of the cloze procedure reveals its concurrent validity by correlating cloze test results with the results of other reading tests. Many such comparisons now reveal that the cloze procedure has considerable concurrent validity as a measure of reading.

One investigation by Weaver and Kingston (40) sheds light on the "factorial validity" of the cloze procedure by studying what relatively pure abilities are being measured. These investigators included 8 cloze tests in a battery of 18 cognitive tests which they submitted to a factor analysis. Three factors were found: (1) verbal comprehension, (2) redundancy utilization, and (3) rote memory, flexible retrieval. The cloze tests were most closely related to "redundancy utilization," and, unexpectedly, they were only moderately related to verbal comprehension. Much specific

variance associated with cloze tests was unexplained. More research is needed to account for this.

Greene (16) studied the "construct validity" of the cloze procedure as a measure of reading comprehension by assuming that two factors (i.e., "words" and "relationships between words") account for most of the variance in reading comprehension test results¹, preparing a test to measure each of these factors, and correlating cloze test results with these two tests. Greene found significant correlations ranging between .49 to .59 between cloze tests and both criterion tests and observed (like Weaver and Kingston) that there was a considerable amount of variance not accounted for by cloze scores. He concluded that the cloze procedure is more complex than was thought.

In summary, although a good bit of work attests to the "concurrent validity" of the cloze procedure as a measure of reading, more studies are needed to determine its "factorial" and "construct" validity.

The Measurement of Verbal Abilities

Several studies have been carried out showing the relationships of cloze tests to tests of verbal abilities (or aptitude). Taylor (38) correlated a pre-cloze, any-word deletion test with the *Air Force Qualification Test*. His study yielded a correlation of .72. Correlation with the Word Knowledge sub-test was .85, and correlation with the Arithmetical Reasoning sub-test was .70. Jenkinson (19) obtained a correlation of .69 between a pre-cloze, any-word deletion test and I.Q. Fletcher (13) correlated a pre-cloze, any-word deletion test with the *American Council on Education Psychological Examination*. He found a correlation of .72 with the Linguistic sub-test and a correlation of .45 with the Quantitative sub-test. Weinfeld (41) (according to Carroll *et al* (6)) carried out a factor analysis of 28 cognitive tests, including a pre-cloze, any-word deletion test. He found the cloze test to be highly correlated with a number of cognitive factors. His "indices of association" between the cloze test and each factor were as follows: Reasoning Factor .76, Verbal Factor .70, Theme Writing .59, Fluency of Expression .54, Word Fluency .50, Ideational Fluency .40. Hafner (17) obtained a correlation of .73 between a pre-cloze, any-word deletion test and the *Otis Quick Scoring Mental Ability Test* and a corre-

¹This two-factor concept of reading comprehension was based upon a survey of factor analyses of reading tests by Rankin (25).

lation of .56 between the same cloze test and the Information subtest of the *Wechsler-Bellevue Intelligence Scale*. As previously noted, Weaver and Kingston (40), unlike other investigators, found only a moderate relationship between cloze tests and a verbal comprehension factor. Greene (16) obtained correlations of .52 and .61 between two different types of cloze tests and a verbal reasoning tests (*Understanding Communication*) by Thurstone.

The general consensus of these findings is that the cloze procedure is strongly related to a variety of verbal abilities.

The Measurement of Listening

The cloze procedure is not limited to reading material; it can also be used to study the effectiveness of communication of aural material. Taylor (37) compared the predictability of words deleted from a "poorly written" radio script with a "well written" script. He found higher cloze scores for the better written script. Carroll *et al* (6) compared cloze scores on a passage read with normal expression with scores attained on a "non-expressive" passage. No differences were found. Weaver (39) studied several characteristics of aural and written language using the cloze procedure. He found reading cloze scores to be higher than listening cloze scores, and he found higher scores for "structural" (i.e., any-word) deletions than for "lexical" (i.e., noun-verb) deletions. His major finding was that structural meaning is conveyed better through silent reading than through listening, but lexical meaning is conveyed equally well by reading and listening.

These few studies indicate that the cloze procedure is a useful technique for the study of listening.

The Measurement of Foreign Language Achievement

Carroll *et al* (6) studied the cloze procedure as a measure of proficiency in a second language. They found that cloze tests differentiated between learners and native speakers, correlated significantly with teachers' grades in foreign language and with foreign language scores on the *College Entrance Examination Board*. They concluded that cloze tests might be used to measure group differences in foreign language competence, but were not suitable for measuring individual differences because the tests tended to have low reliability and were heavily affected by various sources of extraneous cognitive factors which are independent of competence in a foreign language.

Miscellaneous Studies

The only element in common to the following studies is that they have utilized the cloze procedure in a measurement capacity and they have not been mentioned in this survey. Lack of space prevents a description of their findings. Instead, the problems under investigation will simply be listed. Taylor (35) studied the relationship between cloze and entropy measures. Cofer (7) explored the effect of style as indicated by the adjective-verb quotient as a factor in retention. Cofer and Jenkins (8) studied the learning of two stories by means of the cloze technique. Jenkins (18) investigated cloze responses as a function of commonality of associations. Osgood (22) studied stereotopy as a function of motivation level. Manis and Dawes (21) analyzed the relationship between cloze scores and attitude. Coleman (9) explored the effect of shortening sentences upon improving comprehension. Salzinger *et al* (32) studied the effect of order of approximation to the statistical structure of the English language upon cloze responses. Coleman and Blumenfield (10) used the cloze procedure to compare the comprehensibility of nominalized sentences with their transformations using active verbs. Fillenbaum, Jones, and Rapoport (12) studied the predictability of words and their grammatical classes as a function of rate of deletion. The variety and scope of these studies illustrate the great potential of the cloze procedure as a research tool.

The Cloze Procedure as a Teaching Device

Although the cloze technique was originally conceived as a measuring instrument and most research has used it as such, it would seem possible to construct cloze exercises for training purposes in the improvement of communication skills such as reading and listening. A few studies have investigated the cloze procedure as a reading improvement technique.

Bloomer (1) constructed cloze exercises based upon elementary school reading material at various grade levels by deleting every tenth word in 500 word passages. These exercises were taken by an experimental group of volunteers in a college reading class. Subjects passed from one level of material to the next depending upon successful performance at prior levels. Time spent in the program varied depending upon the number of exercises completed; credit was given for synonyms. The instructor played a minimal role in class.

The experimental group was compared on the basis of reading skill and grades with a randomly selected control group who received no training in reading. No significant improvement in rate was found for either group. The experimental group gained significantly in comprehension, while the control group showed a significant decrease in comprehension. On vocabulary, the control group improved significantly but not the experimental group. The two groups were also compared upon the basis of the difference between predicted and achieved college grades at the end of the year. The experimental group grades were significantly higher than predicted, but the control group grades were slightly lower than predicted. Bloomer concluded that the cloze exercises facilitate improvement in reading comprehension and grades but not in rate and vocabulary. This study has certain inherent limitations. The fact that the control group was a significantly superior group of readers to begin with and the fact that the experimental group was made up of volunteers while the control group was not, suggests that some of Bloomer's findings could be a function of uncontrolled regression and motivation variables.

Roossinck (28) developed a learning program in paragraph comprehension for 6th grade children by applying the cloze procedure to a model of reading comprehension developed by Smith (32). She prepared 200 cloze exercises with one or more key words deleted. Words were selected to measure aspects of comprehension as developed in Smith's model. Vocabulary was at the fourth grade level, and paragraphs were written in a series of increasing complexity according to a procedure developed by Smith (31). A covering device exposed one item at a time, and correct answers were revealed immediately after each response. Credit was given for synonyms. The program was evaluated in terms of (1) percentage of correct responses, (2) the difficulty of individual frames, and (3) the effectiveness of prompts on comprehension clues. After initial trials and revisions, a program was developed which yielded a high rate of accurate responses.

Friedman (14) conducted a study on the use of the cloze procedure for improving reading comprehension of foreign university students. She used an experimental and a control group of foreign students. Twenty cloze exercises were based on materials from the *McCall-Crabbs Standard Test Lessons in Reading*, grade levels 3-7 by deleting 20 words from each passage by an every 5th deletion pattern which left some unmutilated context at both

the beginning and end of each paragraph. Each cloze exercise was followed by a multiple-choice test; credit was given for synonyms. Both groups met one day per week for 10 weeks. The experimental group worked through two cloze exercises per session, and the control group worked through four regular unmutated exercises per session in the same book. Both experimental and control groups made significant improvements in comprehension, but there was no significant difference between mean gains of the experimental and the control group.

In the present writer's opinion, the cloze procedure has very real potentialities as a teaching device, but available evidence is limited and not very convincing. Much more work is needed in this area.

Methodological Considerations

Age Groups

The writer is often asked with what age groups the cloze procedure can be used. This is an empirical question which only research and practical experience can answer. Bloomer (1) has suggested that since a person must be able to understand all words in the context of a blank space in order to make reasonable predictions of the omitted words, that a student should have at least a junior high school reading word recognition skill in order to make cloze responses. There has been no systematic research on this question. The great majority of studies reported in this survey have used college students as subjects. Two investigators (Jenkinson (19) and Carroll *et al* (6)) have used high school students. Four studies have used elementary school children. Bormuth (2, 3) used 4th, 5th, and 6th grades and obtained very high reliability and validity coefficients. Brooks (5) used material written at both the basal reading level and frustration reading level for mentally retarded elementary school children. Roossinck (28) developed programmed cloze procedure material with a high percentage of correct responses using 6th grade children. And Ruddell (29) found high reliability and validity coefficients on a series of cloze tests using 4th grade children. Apparently cloze tests and exercises can be prepared for use with children at least in the upper elementary school age bracket.

Pre-Cloze versus Post-Cloze

For purposes of group study, there is very little evidence to guide one in choosing between use of the pre-cloze and the post-

cloze testing procedure. It is of course easier to use the pre-cloze procedure for it is less time consuming. Taylor (38) found slightly higher correlations between his post-cloze test and his comprehension test than he did between his pre-cloze test and the same test. Similarly, his correlations between cloze tests and the *Air Forces Qualification Test* tended to be slightly higher for the post-cloze than for the pre-cloze test. Most of these differences were probably not statistically significant. Rankin (23) also obtained slightly higher correlations between a post-cloze test and sub-tests of the *Diagnostic Reading Test-Survey Section* than between a pre-cloze test and this same criterion test. However, only one difference between correlations was significant. Most of the validity coefficients listed in this survey were obtained on pre-cloze tests. In general, for purposes of studying groups, the extra time and effort involved in using the post-cloze procedure may not produce sufficiently superior results to justify the greater effort. However, due to differential effects of personality upon pre- and post-cloze tests (see Reading Gain section), the pre-cloze test is not recommended for the study of individuals.

Length of Test

The question of cloze test length must be determined in terms of practical considerations of time, fatigue, etc. and how much test reliability is needed for a given purpose. As a rule of thumb, Taylor (37) has suggested that a 50 item test provides a sufficient sample for a stable score with chances for easy and hard words to cancel out. Most of the cloze tests used in the studies cited in this survey have contained in the neighborhood of 50 items. Most of the reliability coefficients have been high enough for group comparisons but not for individual study. Even with 50 item tests, Bornmuth (4) found significant differences between means for over half of 20 cloze test forms. The mechanical selection of words for deletion in the cloze procedure tends to produce a sizable number of non-discriminating items which lower reliability. Consequently, cloze tests must be fairly long. In the use of the cloze procedure as a teaching device, such considerations do not apply.

Word Deletions

Random versus Every-nth Selection.—One of the most characteristic features of the cloze procedure is the use of a completely mechanical system for choosing words to be deleted. Words can be chosen either at random or by using an "every-nth" procedure.

Of the two approaches, the "every-nth" procedure is easier to use. Only one investigation known to the writer has compared cloze test results by these two deletion techniques. On a short 16 item cloze test, Taylor (34) found that a random 10% deletion and an every-tenth word deletion both ranked the readability of three passages the same and produced significant "between passages" F-ratios. On a "between-subjects" comparison, the random method produced a significant F-ratio but the other procedure did not. He concluded that these two techniques would yield more nearly equivalent results if more than 16 deletions are used. All other studies cited in this survey have used an "every-nth" procedure instead of the more cumbersome random method.

If the "every-nth" procedure is used, there is no hard and fast rule for deciding what deletion-rate to use—every 2nd word, every 5th word, every 10th word, etc. Both Taylor (37) and MacGintie (20) have found every 5th word deletions to be independent. Consequently, Taylor suggested that every 5th word deletions are as far apart as they need to be. Most, although not all, studies covered in this survey have used an "every-5th word" deletion pattern. It does not follow, however, that this pattern is suitable for all materials, age groups, and purposes for which the cloze procedure may be used. More work is needed on this question.

Mechanical versus Rational Deletion.—The cloze procedure was conceived as an essentially objective, mechanical method of studying communication which can be used by persons who may be untrained either in test construction or in the subject matter covered by a cloze test or exercise. The question has often been asked as to whether or not a better cloze test could be constructed if some element of rationality or subjectivity entered into selection of cloze items. Greene (16) compared a "standard" post-cloze, any-word deletion cloze test with a "modified" post-cloze, noun-verb-adverb-adjective deletion cloze tests with word deletions restricted to words which were subjectively evaluated as having sufficient redundancy to allow their prediction by a superior reader. He found that the modified test had better reliability, a better distribution of item difficulties, and better item discrimination. Subsequent analysis revealed these differences to be a product of the rational selection procedure rather than the grammatical word form restriction. However, validity coefficients for the two tests were not significantly different. He concluded that although time and effort involved in constructing the modified test was con-

siderably greater than for the standard test, the modification did not produce a significant difference in its effectiveness as a measure of reading comprehension.

Types of Words to be Deleted.—Cloze tests can be constructed by deleting words without respect to grammatical form or by restricting deletions to certain types of words. Taylor (38) studied correlations of three types of cloze tests formed by deleting (1) any-words, (2) easy-words (i.e., conjunctions, pronouns, articles, verb auxiliaries), and (3) hard-words (i.e., nouns, verbs, adverbs). He found significant correlations between all three types of cloze tests and criterion tests of pre-reading knowledge, immediate recall, and aptitude, but the easy-word correlations were the smallest. With one exception, the any-word correlations were the highest, and he concluded that for purposes of testing comprehension, aptitude, and readability, the any-word form was superior. The hard-word form correlated best with pre-reading knowledge.

Using an analysis of meaning by Fries (15), Rankin (23, 24) hypothesized that two aspects of meaning could be "tapped" by the cloze procedure by two different deletion procedures. He predicted that an any-word deletion would best measure the grasp of "structural meaning" (i.e., syntax) and that a noun-verb deletion would best measure the grasp of "lexical meaning" (i.e., substantive context). These hypotheses were tested and confirmed. Most research has made use of the any-word procedure.

Scoring Methods.—It is possible to score cloze tests by a strictly objective procedure in which credit is given only if the exact word is replaced in the blank space. A more subjective procedure can also be used in which credit is given for synonyms. The subjective scoring technique is much more laborious. It is a question of some practical importance to determine which method should be used for both measurement and teaching purposes. There is some experimental evidence on this point. Taylor (34) ranked three passages for cloze readability on the basis of objective scoring and synonym scoring. Although synonym scoring produced higher total scores, the degree of differentiation among passages was almost identical. Rankin (23, 24) found correlations of .86 and .92 between cloze scores based on objective and synonym scoring systems for two different cloze tests. He also found no significant differences in test reliability or validity for the two scoring systems. Ruddell (29) found validity coefficients to be

about the same when based on tests graded by both scoring systems. His experimental findings were similar using both methods with slight differences in favor of objective scoring. These investigations support the conclusion that for measurement purposes, the more tedious and subjective procedure of giving credit for synonyms is not worthwhile.

For purposes of teaching with cloze exercises, giving credit for synonyms is probably advisable. This procedure has more face validity from the standpoint of the student, and the student receives more positive reinforcement. All three studies on using the cloze procedure as a teaching device which are cited in this survey have used the synonym scoring procedure.

Most cloze tests are scored simply on the basis of the total number of correct responses. Several other scoring procedures have been used which are worthy of further investigation. Fillenbaum and Jones (11) developed a ratio of correct word predictions to correct grammatical form predictions (i.e., the proportion of correct word predictions given the correct grammatical form prediction) as an indication of semantic selection difficulties among individual aphasic patients. Hafner (17) developed several interesting scoring methods. He used a ratio of correct connective word completions (i.e., conjunctions, prepositions, verb, auxiliaries, and articles) to correct content word completions (i.e., nouns, verbs, adjectives, adverbs, and gerunds). He used a GCIA score which is defined as the per cent of grammatically correct predictions of those word predictions which were incorrect. In addition he investigated the use of an Incongruity score defined as the frequency with which cloze responses are incongruent with clearly stated information in the passage or with the sentence language pattern. All of these scoring methods need further study and research.

Summary

This paper has revealed research evidence on the value of the cloze procedure as a measuring instrument and as a teaching device. In addition, research findings relevant to various methodological problems have been described. In conclusion, it may be said that there is abundant evidence pointing to the validity and usefulness of this technique as a measuring instrument. Correlations with various validity criteria are sufficiently high to show that it has satisfactory concurrent validity, and yet studies of factorial

and construct validity suggest that the cloze procedure has unique characteristics not possessed by other measuring devices. Many questions remain to be answered by research on methodological problems. More evidence is needed on the efficacy of the cloze procedure as a teaching device.

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Addendum

The following studies using the cloze procedure were located after this survey was completed:

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Implications of Cloze

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The purpose of this paper is to discuss the implications of cloze* rather than to review the research systematically. However, it will be necessary to allude to some of the research. The basic approach to this discussion of implications will be in terms of applications to education. Some of these applications have been mentioned by cloze researchers. It is hoped that a few of the applications and implications will be somewhat original. Since the writer feels that cloze procedures have far-reaching implications for education, although these implications are not always clearly delineated in cloze's inchoate stage of development, he will in some instances be making adumbrations of things to come in this field.

The writer will attempt to discuss various areas of application of cloze. Although there will be a certain amount of overlap among the areas, it is hoped that such repetition will not be too disconcerting to the reader.

Reading Comprehension. The ability to read with understanding can be measured rather well by the cloze. At the intermediate grade level, Bormuth (1, p. 133) has shown that correlations between scores on cloze tests and scores on tests of seven different types of comprehension generally run high.

Various researchers, including Jenkinson (3), have obtained high correlations between cloze scores and comprehension scores of standardized reading tests at the adult level. In the light of this information, it is suggested that cloze be used to evaluate achievement in reading comprehension.

Rankin (5, p. 231) has suggested that since cloze tests are not difficult or expensive to construct, it is possible for a teacher to prepare a number of cloze tests of equal difficulty in order to make frequent evaluations of a person's ability to read with understanding. Thus, evaluation of progress in reading is done more often and at less expense than is possible with some instruments. This is

*In the cloze technique, subjects supply words that have been deleted from a reading selection. The subject's score is one index of his ability to comprehend reading matter.

not to suggest that the cloze can replace the reading inventories developed in recent years by authors such as Botel, N. B. Smith, and Spache. Reading inventories and cloze tests can complement one another.

If the teacher discusses the responses to cloze tests in class with the students, valuable insight about the students' reading problems can be obtained. It might be added that even though standardized or informal measures of reading may excel the cloze tests in certain respects, the possibilities of the cloze should be explored by the teacher.

Writing. We are basically interested in reading, but since it is writing that we read, anything that a writer can do to improve his writing should make reading all the more understandable, enjoyable, and useful.

How can writing be improved? Weaver and Kingston's (7, p. 259) factor analysis study of cloze emphasized that redundancy in writing can make a selection easier to read—(as the present writer prefers to define it, redundancy is using more than the "minimum" number of words needed to get an idea across). Verification of this contention comes from a statement by J. R. Pierce (4, p. 163) that redundancy can be added to a "non-redundant message in order to attain virtually error-free transmission over a noisy channel," i.e., one can add explanations to and restate the points of a terse message in order to make it clear in the face of various distractions.

Many people who have had to labor with the terse writings in mathematics texts or the concept-packed geography and biology texts will testify to the need for redundancy (as we have defined it) in reading material. At the college level one has only to look at some of the texts in fields such as general psychology, biology, and government for examples of competitive concept stuffing. Writers must remember that writing which is redundant to the initiate may look quite terse to the tyro whom the writer is ostensibly educating.

Appropriate amounts of redundancy in the form of more illustrative and explanatory material per concept discussed will be a welcome, as well as a necessary, inclusion in future textbooks in these and other fields. It appears, then, that writers need to consider the *reader* by striking the proper balance between terseness

and redundancy rather than trying to pack as many concepts per page as their competitors.

Cloze procedures should be used by publishers and authors as a fairly inexpensive method of conducting field trials of the readability of early drafts of chapters in their books. The field trials being planned to determine the readability of this writer's revision of the New Testament of the Bible compared to the readability of other modern versions are an example of the application of cloze techniques which should prove beneficial to the reader.

Creativity. If you know persons who are both highly creative and highly intelligent and if you have read some of the research procedures which create a high creativity versus high intelligence dichotomy, you realize that those who are both highly creative and highly intelligent are not being represented. The less knowledgeable readers of creativity research may feel that high intelligence and high creativity are mutually exclusive. What is needed are new and better means of discovering individuals who have the potential to produce things that are not only novel, but also significant.

Preliminary work with the cloze procedure to study aspects of language creativity seem to indicate a field rife with interesting research possibilities. Whether such procedures will discover the potential creator of significant ideas is highly conjectural. The writer has begun work with a cloze pattern that he calls the "inverted" cloze to study aspects of creativity. One paradigm for this type of study is:

The _____ of _____
_____ can _____ when
_____.

Intelligence, Concept Development, and Dynamics of Thinking. Two of the most important factors common to intelligence tests and to reading tests are those of vocabulary and reasoning. College reading teachers who check the discrepancy between comprehension scores and vocabulary scores on reading tests infer that some of the students whose vocabulary scores are lower than their comprehension scores appear to be reading "over their heads." Their ability to reason allows them to "get by" in reading. However, precision reading, mastery of details and the more complex relationships, and a feeling of confidence about reading require

Of course, this thinking is not always of the highest quality. Research by the writer (2, p. 139, 40) has shown that on cloze tests administered to college seniors the "subjects who make incongruent responses tend to make lower scores on tests of information, general reading comprehension (cloze), intelligence, vocabulary, and course achievement." The incongruency score in cloze procedure is the "number of times responses are incongruent with clearly-stated information in the context or with the language pattern of the sentence." (2, p. 137) One of the writer's main purposes in using cloze exercises in reading improvement courses is to try to show the students that not only are they too oblivious to incongruencies of their own making, but also to those incongruencies encountered in print or in speech. In class we strive to overcome this fault by pointing to incongruencies in the thinking of people in various walks of life and by trying to discover incongruencies that arise in our own thinking. An attempt is made to transfer any gains made in recognizing incongruencies while doing cloze exercises to other situations and vice versa. Of course, while the principle about "casting out the beam in one's own eye" is used to encourage charity when pointing out the incongruencies in the thinking of other people, it should not be used to condone lethargy or any injustices resulting from such lethargy.

This is an area where well-planned research needs to be done in order to discover the quality and quantity of improvement in thinking that might be effected through the use of cloze procedures. The findings of such research could provide important guidelines for education.

Readability. According to Taylor, (6) cloze procedure does a creditable job of ascertaining the readability of various kinds of material, including the unusual and archaic styles that stymie the conventional readability formulas. The use of cloze procedures to ascertain the readability of general psychology texts should do something to correct the low, unrealistic estimates of the reading difficulty of these texts obtained by conventional readability yardsticks. The estimates do not reflect on the computational abilities or the good intentions of the researchers. However, in the estimation of this writer, students who read at the level corresponding to the estimated difficulty of these texts encounter many problems in trying to cope with the meanings in these texts. This fact probably reflects weaknesses in the ability of reading tests of a conventional nature to assess ability to read as well as

weaknesses in the ability of the readability formulas to ascertain the reading difficulty of the selections.

This writer would like to encourage the setting up of a center to which cloze-type readability indices of reading could be sent by researchers. In order to standardize these indices, variables such as the characteristics of the population used would need to be incorporated into a transformation formula. Assuming that (1) such a system for transformation of scores does not exist, (2) it is feasible, and (3) it could be made practicable, it behooves some enterprising scholar to develop such a transformation system. Periodically the names of books and their standard readability indices would be published.

Deletion Patterns. Recently this writer began to experiment with various patterns of cloze deletion in order to determine the relationships of these patterns to various psychological and educational variables. One such pattern which seems to hold some promise is the 2—1—2 letter deletion pattern for mutilating single words in a list of words. An example of this type of deletion is in _ e _ li _ e _ ce; another is fr _ s _ _ ra _ e.

In these experimental procedures, words of a wide range of difficulty are selected according to a random sampling plan. The difficulty of each word is determined and the words are arranged according to difficulty. (It should be noted that this pattern deletion tends to alter the "difficulty" of the word somewhat.) This writer has devised tests that can be used with groups of students ranging from third grade level to graduate level—one test for the entire range. Presently, the total testing time for a test of sixty items is twelve minutes. Future refinements of the entire process should cut this time in half.

Preliminary results with this exploratory instrument indicate high correlations with reading tests at the elementary level. Preliminary results at the college level are equivocal in terms of correlations with standardized reading tests. Correlations of "2—1—" pattern cloze scores with *Nelson-Denny Reading Test* total scores is low positive. Students who overachieve on this "two-one" pattern cloze in comparison with their *Nelson-Denny* total scores more often rate themselves on a personality inventory as being friendly, energetic, sociable, and cheerful than do those students who underachieve on the "two-one" pattern cloze. Refinements in method

will be necessary in order to bring the potentialities of the system to fruition.

Summary

This discussion of implications of cloze is basically in terms of applications. Areas of application are: reading comprehension; writing; creativity; intelligence, concept development, and dynamics of thinking; readability; and deletion patterns.

Cloze is an acceptable measure of reading comprehension. Progress in reading comprehension can be evaluated often through administration of a number of cloze tests of equal difficulty. Cloze will not replace current reading inventories, but complement them.

Adding appropriate amounts of redundancy to written material can make it easier to read. Since many college texts appear to be terse and plagued with problems of concept density, it is suggested that authors try to strike a balance between terseness and redundancy. Publishers can conduct field trials of the readability of early drafts of chapters in their books to see if the readability is appropriate to the intended market.

New and better means of identifying individuals who can create things that are creative and significant are needed. Some form of cloze can be used by researchers in an attempt to develop a useful identification instrument.

People who read well despite a deficiency in conceptual background need a still greater mastery of concepts in order to master more difficult materials with precision and a feeling of confidence. Attention to concept development should start early in life and be maintained in an adequately-rich milieu. Cloze procedures using various kinds of materials might provide one way of stimulating concept-building and problem-solving activities and provide insight into the reasoning processes of students.

Well-planned research should be done in order to discover whether improvement in quality and quantity of thinking might be effected through the use of cloze procedures.

Cloze procedures can ascertain the readability of material in instances where conventional readability formulas have failed. It appears that conventional readability yardsticks at the college level and reading comprehension tests conspire to misguide those who (1) write texts, (2) do readability research, and (3) select

texts for college courses. Cloze procedures should be used to ascertain the readability of texts.

A center for collection and dissemination of cloze-based readability estimates, if feasible and practicable, can render a distinct service to education.

Preliminary results utilizing new cloze deletion patterns indicate that these patterns be used by researchers to develop inventories that provide valuable psychological information in a very short period of time.

It is hoped that the use of cloze procedures will not only help individuals to see the gaps and incongruencies in their knowledge, attitudes, reasoning processes, and lives, but that it will help them to fill those gaps successfully, to the enrichment of their own lives and the lives of others.

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Evolution of the Purdue Reading Program

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Purdue University

At the request of the president of the university, and after a survey of various reading programs by a team of seven members of the Department of English, the Purdue Developmental Reading Program was begun in the fall of 1950 with a course called English X.

In setting up the course, many questions had to be answered. In the first place, what was reading? Could reading efficiency be improved sufficiently at the college level to justify a course? Or did college students already read well enough? For whom should the course be aimed? Should the course emphasize skills? Should it lean toward critical analysis? Should any mechanical devices be employed? These and many other questions came up. From many conferences, consultations, and the visits to already-established programs, the decision came to make the course non-credit, to have two fifty-minute meetings a week for sixteen weeks, and to make the course elective, open to students from all schools in the university. For the initial offering, enrollment was limited to 300.

The course was designed to improve the reading efficiency of a wide spectrum of students, excluding only those who had physical, emotional, or mental handicaps which required professional assistance. It was, therefore, not a remedial course in the usual sense of this term. The committee organizing the course believed that almost all college students read at a level of efficiency considerably below their potential, and that if this efficiency could be improved, the students would profit in all college work, and in addition, if they developed the reading habit, they would add immeasurably to their general knowledge and pleasure. From the outset it was determined that the course would not be a speed course, that comprehension and flexibility would be emphasized. The principal aims of the course, which have not changed materially from that first semester, are to

1. Improve physical skills—widen span, improve rhythm, and reduce regressions.

2. Teach flexibility—adapting speed to purpose.
3. Show there are a variety of “comprehensions” in reading matter.
4. Develop judgment, critical analysis, understanding, decision-making, and improvement of taste.
5. Increase vocabulary.
6. Show that increased reading efficiency is useful in almost all aspects of living.
7. Help develop a liking for reading, and thus expand the student's horizons.
8. Help make reading a profitable pleasure.
9. Develop student's confidence.

These aims are carefully explained to the students, and since a reading course is unusual to many students, a good deal of attention is given in the opening sessions to answering questions and establishing attitude.

The materials used when the course was instituted were the *Harvard Reading Essays and Films*, a tachistoscope, and the *Diagnostic Reading Test, Survey Section*. An electro-oculograph was soon added to the course materials. (Eye movement patterns are used for diagnosis, motivation, check on progress, and for research.)

Procedure has remained relatively stable over the years. About one half of each period is spent at the pacer. Showing a film or giving a timed essay takes up additional time. Usually the instructor talks five or ten minutes about reading skills, vocabulary, or some other aspect of reading. Individual record-keeping in speed, comprehension, and progress have always been stressed. Each student has his own record in a folder. Classes were from the first held in reading laboratories especially designed for the course.

It is made clear to each student and emphasized that he is competing chiefly with himself, that he is largely on his own, that his progress depends on his own effort, and that he will be graded against himself, not against a class average.

Except in procedure, a number of significant changes in the course have taken place over the years. Some of the most important ones are as follows:

(1) In September 1952, the course began to carry two-thirds of an hour credit. Credit was offered because there was evidence, after two years, that students made gains in both comprehension and speed as measured by both the *Diagnostic Reading Test* and the *Harvard Tests*. The offering of credit had two positive effects on the new course—it discouraged drop-outs, which was one of the early problems, and it gave the course additional status, since many students, and staff people as well, feel that if a course carries credit, it must have more value than if it does not.

(2) In June, 1953, the faculty of the School of Science made English X a requirement for graduation. This change increased enrollment, and more important, indicated that the course had considerable university approval.

(3) In September 1953 the course name was changed from English X to English 185, suggesting the course was no longer experimental.

(4) In September 1953 the use of the tachistoscope as one of the teaching tools was discontinued. This change took place because both experience and research suggested that improvement came as quickly without the tachistoscope, that what value the device had was achieved by the use of paced films.

(5) A year later, in September 1954, the *Cosper-Griffin Progress Tests* were used instead of the *Triggs* and *Harvard Tests* as a basis for statistics.

There were several reasons for this. It is believed that the kind of reading improvement—that is, over-all improvement—which comes from a course of this kind cannot be measured clearly in the framework that the *Diagnostic Tests* uses. It was felt that a continuous test, rather than a series of short tests, would better measure improved efficiency. Furthermore, in the *Cosper-Griffin* material six equated tests, with informal norms, gave opportunity to measure progress frequently during the semester.

(6) In 1955 the *Purdue Reading Films* were substituted for the *Harvard Films*. It was felt these new films contained more variety than the *Harvard Films*.

(7) Beginning in September 1960 the credit in English 185 was increased from two-thirds of an hour to one hour. This was done because the prevailing feeling was that the amount of work done warranted more credit. In addition, two-thirds was a clumsy figure to use in grade totals.

(8) In September 1963, with changes in school structure, the course was no longer required by any school; it became an elective. However, on an informal basis, some schools continued to require their students to take the course.

The question of grading was from the beginning one of the problems of English 185. Once we began giving credit, how to grade assumed even more importance. As already indicated, we decided early in the history of the course that evaluation should be largely non-competitive. Furthermore, our problem was compounded because it is quite generally accepted that the measurement of reading progress—and total reading efficiency—are not easily established on an objective basis. In addition we have had a great variety of students, from different backgrounds and different schools; we therefore decided on general minimums for satisfactory completion of the course. We expect some progress from the student, both in comprehension and speed, based on beginning-and-end tests of equivalent difficulty. We expect very good attendance; in fact we penalize the student who fails to make up *any* work he has missed. Our rationale here is that the course is in part a skills course, and missing part of the skills training is a serious matter. We expect the student to go about his work seriously, not merely go through the motions of reading or looking at a film and then answering questions; we expect him to keep his pacer speed adjusted to his progress. Since he records some of his own marks, we expect him to be honest. (We do, however, have two beginning and two end tests graded by the instructor. On one of these the student is allowed six minutes to read or reread, thus giving a premium to the more efficient reader; on the other the student is timed, and may read the material only once.)

Early in the semester we make arrangements for students to come to "extra" laboratory periods, on a voluntary basis, to read at the pacers and take extra timed essays. For a number of years, if a student satisfactorily completed twelve such sessions during the semester, his grade was ordinarily raised one letter. Later we reduced the required number of extra hours to eight. We do not consider our grading system perfect, or even totally satisfactory, but experience has not given us any reason to change it radically.

Instructor training has been carried out within the Department of English largely through the apprentice system. Regular members of the Department who teach the course are briefed, sit in on

classes, and on their own time inform themselves on the teaching of reading. Graduate assistants, in addition to these measures, are required to take a graduate course, English 687, Developmental Reading, which is a rather thorough study of theory and method.

From the beginning of the program, research has been carried on along with instruction. Over the years, various pieces of research, often done in cooperation with people in the Department of Psychology, Educational Reference, and Statistics, have suggested a number of conclusions. For lack of time, these cannot be elaborated on extensively in this paper, but we have on file evidence to indicate their validity. Some of these findings are listed below.

1. Reading efficiency is one of the best predictors of academic success. (The reading efficiency score is the standard one of speed times comprehension.) The conclusion reached agrees with findings in similar research conducted in other schools.

2. Improvement in speed and comprehension are retained substantially eighteen months after the completion of a reading course. Other studies agree, although the percentage of retention may vary quite widely.

3. English 185 improves the speed and comprehension, as measured by standardized tests, of virtually all students who take the course. Our experience here, based on thousands of students, is that virtually a hundred per cent of the students improve speed, and some ninety per cent improve in comprehension.

4. There appears to be no relationship between intellectual achievement and improvement in reading. This conclusion, in agreement with other research, may seem surprising. Perhaps it should be taken with caution because of the many hard-to-control variables.

5. Improvement in vocabulary as a result of taking English 185 is markedly less significant than improvement in speed and comprehension. Our conclusion here has been repeated over and over. Other reading programs have had similar experience.

6. Good attendance has a clear effect on improvement in speed and comprehension in English 185. This conclusion seems inevitable, since the course is partly a skills course, and in its entirety is an "experience" course.

7. Tachistoscopic training has little effect on gains in speed and comprehension in English 185. The conclusion here is not always the same in similar research done elsewhere. However, since we use reading films, which are in a sense tachistoscopic in nature, perhaps the films cancel out the usefulness of tachistoscopic training.

8. Eye-movement patterns can be changed by English 185. Span can be increased; fixations and regressions can be reduced. The conclusion here is also established in similar research; however, the extent to which breadth of span can be improved is not a settled matter. At the present time we have a research project under way on this subject—the relationship between reading training and eye-movement changes.

9. The improvement in reading skills is not related to visual efficiency. This conclusion, of course, does not apply to "handicapped" vision.

10. Reading speed and reading comprehension are positively related to academic achievement. This is a generally accepted conclusion, although the control of variables is difficult.

11. "Attitude toward reading" is positively related to academic achievement. Taking English 185 improves attitude toward reading. These interesting conclusions are also beset by factors hard to control, and should be accepted with caution.

One or two other aspects of English 185 deserve mention. In 1957, with a grant from the Purdue Research Foundation, the Developmental Reading Staff established the *Journal of Developmental Reading*. The journal from the beginning created considerable interest among reading people, and over the years has published material written by a large number of reading experts. In 1964 publication of the *Journal* was taken over by the International Reading Association, and its name was changed to the *Journal of Reading*. This move has tripled circulation. The editor and managing editor are to be Purdue staff members for the next three years.

Another result of the Developmental Reading course at Purdue has been the increased interest in reading programs in high school. Many courses have been set up throughout the state of Indiana (and many outside the state) with the help of our staff. Visitors from many states and some twenty foreign countries have visited

our classrooms. In addition, in answers to inquiries, we have mailed information and suggestions to over a thousand schools and individuals.

Since its inception our Developmental Reading course has trained over 25,000 Purdue students. For these students the average gain in speed, on college level essay material, has been approximately 300 words per minute, and gain in comprehension has been approximately 12%.

Evolution of the Western Reserve University Program

Esther J. McConihe

Western Reserve University

In 1949 the Reading Improvement Service of Western Reserve University was organized under the control of a special advisory committee of the University. The new service was comprised of three divisions; elementary, high school and college-adult, the purpose of each being the same, that is, to identify the reader who was in need of some type of training in reading and to proceed to furnish the training indicated. It was expected that research would be generated which would further understanding of the reading process. The personnel in charge of executing these services were all from either the departments of Psychology or of Education. It is my purpose here to trace the evolution of the college-adult division of the Service, although after 1956 or thereabouts there is some overlap with the high school program.

In the first year the service was confined to individual training, and most of the clients were those who felt that their reading was poor, that this weakness, whether comprehension, rate, vocabulary or what you will, was resulting in decreased effectiveness in college or in business. The first group training was in college classes which were recruited from students in the University whose primary concern was with improving rate.

In 1951 the first industrial program was initiated. This was to be the forerunner of a long series of industrial contacts extending, in varied form, to the present. We called our industrial program a speed reading program, and rightly so, it seemed, since for the most part we enrolled only higher level executives and professional men. (Women rarely appeared in these groups.) The industrial and professional programs were conducted on company premises. (The staff which conducted these sessions had always to include at least one male of considerable strength since the equipment was extensive and bulky.)

Concurrently with the expanding industrial program, the college program was enlarged to include adults from the community and students from other colleges. So great was the demand that an extensive program was carried on the year around, the summer

program attracting students who were back in Cleveland for vacation and were making the most of their opportunity to improve their reading skills in anticipation of the coming year's study.

In 1954 we moved into what was then a new idea in reading training, the summer training of prospective college students. Our first such programs were confined to simple reading training to improve flexibility and the development of improved approaches to vocabulary study. Later when the schools division was dropped from the University program for administrative reasons, this program furnished the link by which the high school division was merged with the college division of the service. During these years between 1952 and 1958-60 the program became rather widespread throughout the University. In one phase or another it serviced the Medical School, the Library School and in a small way the School of Applied Social Sciences and the Law School. One semester we even conducted a Faculty program, details of which may be found in an article in *Adult Education*.¹

In 1963 the women's college of the University dropped reading testing from its orientation battery. This decision was based upon the fact that over the years since we had first begun testing, the mean scores on the Cooperative Reading Test, C2, Form T, had gradually risen until finally in 1962 the mean lay in the area of the 75th percentile. Of the 250 entering freshmen taking the test, only twelve fell below the 30th percentile on any of the three subtests. While it is not necessarily an infallible measure of good reading, this test is adequate enough that the committee in charge, whether rightly or wrongly, used the high ratings as an indication that too few entering freshmen in this school were poor enough readers to require administering the test to the entire class. Since this time, we have done almost no training of students from the undergraduate school except as we have worked with them in study habits training.

This brings us to the present. Now in 1964 ours is largely a community-oriented service. We have in our beginning group many college freshmen but they are from colleges other than W.R.U. Our advanced class is largely composed of upper-classmen, graduate students and adults from the community who feel the need of refining their skills. The industrial program has become a

¹McCombe, Esther J., "Professors Learn to Read", *Adult Education*, Vol. IV, No. 6.

campus-based program and it services those persons in the business, industrial and professional world who find their reading too slow and inflexible for their needs.

This is the history of the physical development of the program at Western Reserve. In content and emphasis I believe it has developed in three stages. During the initial stage the emphasis was on reading per se and within that framework confined itself largely to developing flexibility. This was certainly true of the group training and in some instances of the individual work. In other cases, individuals required more remedial training and considerable stress on vocabulary development. The industrial training emphasis was entirely upon flexibility. In those early days of the 1950's there was not much published material to be used for training purposes. Norman Lewis' very dependable classic, *How To Read Better And Faster*. Francis Trigg's little handbook, *Improve Your Reading*, the Harvard workbook—these were among the limited number of available commercial aids which we used. Hence, we had to develop our own materials. Perhaps that is why we have such an extensive supply of mimeographed material even now. If we required material, we had to develop it ourselves. This was particularly true of the industrial program where nothing available seemed to us appropriate to the training of able but slow readers. Dr. Robinson presented the situation regarding adult literacy materials in a preceding article.

The second stage of our content development is what I call the Organizational stage. We continued to have the same aims—flexibility with understanding—but we began to approach it from the point of view of organization of ideas in reading. It is logical, if one is working with minds that are able to reason and think logically, to present reading as a thinking process and achieve flexibility through these means. It becomes necessary only that we use materials that enable the reader to organize, and that we point out the logical thinking process of the writer. This became the heart of the program—and still is the principal emphasis of the work with business and professional men and women.

However the student program is now in what I think of as the holistic approach. I mean by this that we look upon reading training as one phase of a total communication process, the others being writing, speaking and listening. We have not as yet included these other skills in the program beyond the point of em-

phasizing reading as a part of the total study habits pattern. We incorporate as much writing as is feasible; precise and summary writing, for example. In the program for entering college students one-third of the time is devoted to writing. With this group listening becomes an exercise in listening for the purpose of taking notes. We integrate the organization approach into this phase by emphasizing outlining, systematic note-taking, time planning and reading with a specific purpose in mind, all of which are, as you observe, organizational activities. For the recent high school graduate or college freshmen such an approach to reading means that he learns to view all reading as organized thinking having a central theme and supporting details and each experience in reading as having a specific purpose.

To supplement this resume the attached list of materials is submitted for your consideration. This list contains some of the material which we have found useful at varying times over the years since 1950. It is not to be considered comprehensive or definitive but rather as a compilation of some of the material which we, in our specific operation, have used.

A Partial List of Materials

Used By

Western Reserve University, Reading Improvement Service

(from 1950 to 1964)

- Baker — *Reading Skills* — Prentice Hall
 Brown — *Efficient Reading* (both Alternate & Revised Editions) — D. C. Heath
 Center — *The Art of Book Reading* — Scribners' Son
 Chase — *The Tyranny of Words* — Harcourt, Brace
 Cuomo — *Becoming A Better Reader* — Holt, Rinehart and Winston
 Farquhar, Krumboltz and Wienn — *Learning to Study* — Ronald Press University
 Frost, Goldberg and Block — *A World of Words* — MacMillan
 Gardner — *Great Essays in Science* — Washington Square Press
 Gilbert — *Power and Speed In Reading* — Prentice Hall
 Glock — *The Improvement of College Reading* — Houghton Mifflin
 Goodman — *New Ways to Greater Word Power* — Dell Publishing
 Goth — *Concise English Handbook* — Wadsworth Publishing
 Jones — *Practical Word Study, Form B* — Oxford University Press
 Leedy — *Reading Improvement for Adults* — McGraw Hill
 Lewis — *How to Read Better and Faster* — Crowell

- Miller — *Increasing Reading Efficiency* — Holt
- Morgan and Deese — *How to Study* — McGraw Hill
- Pauk — *How to Study* — Houghton Mifflin
- Raake — *Word Resources* — Odyssey
- Shaw — *Effective Reading and Learning* — Crowell
- Sherbourne — *Toward Reading Comprehension* — D. C. Heath
- Smith, D. — *Learning to Learn* — Harcourt, Brace and World
- Smith, N. B. — *Be A Better Reader, Book III* — Prentice Hall
- Spache and Berg — *The Art of Efficient Reading* — MacMillan
- Stroud, Ammons and Bamman — *Improving Reading Ability* — Appleton-Century-Crofts
- Triggs — *Improve Your Reading* — University of Minnesota
- Weber — *Reading and Vocabulary Development* — Prentice Hall
- Wilking and Webster — *A College Developmental Reading Manual* — Houghton Mifflin
- Wise, Morris, Bradshaw and Walker — *The Meaning in Reading* — Harcourt, Brace
- Wrenn and Larson — *Studying Effectively* — Stanford University Press

The Evolution of the Minnesota Reading Program

A. Garr Cranney

University of Minnesota

The evolution of the Minnesota Reading and Study Skills Program can be described as a progressive individualizing of services offered to students. The current program has developed from the teaching of small groups of students to a program where group procedures have been almost totally abandoned. This is accomplished through packets of self-instructional materials prepared and adapted by the staff. Students practice with materials prepared for their particular needs under the supervision of a counselor.

Before describing the actual operation of the Center, a brief historical review will introduce the assumption underlying the present services. The Center began functioning about 1939 in the Student Counseling Bureau under the direction of Francis Triggs. Most of the early efforts were in the direction of providing speed reading and comprehension exercises in the hope they would provide basic reading skills. When Alton Raygor joined the staff in the middle 1950's students were being taught in small groups. Group exercises, lectures thought to be of value to all students, and some participation in unsupervised practice sessions were then part of the program. During the next few years more in the way of diagnosis and individualized treatment was undertaken. Materials were extended and developed, small groups established in spelling and arithmetic, and some provision made for supervised practice. The main characteristic of the program, however, continued to be the teaching of small groups of fifteen to twenty students.

It was evident to the staff, however, that when students are taught in groups, individual differences are often neglected or only partially considered. In a given group of students the problems vary greatly. One student may want to work only with notetaking skills for two weeks. Another student returning to school after military service may wish to review a variety of skills for several months. A freshman student with a background of low ability comes looking for a quick panacea for low grades. A bright senior enters the Center because he wants to improve himself. A graduate

student in physics is concerned about his reading habits in non-scientific materials. Other students have emotional problems while some enrolled in inappropriate curricula see their difficulties as a reading problem.

It was felt that a more individualized approach would increase the effectiveness of the services. Ordinarily, however, when services are individualized, fewer students are treated and costs per student increase. And with limitations of staff and budget it would have been difficult to change the basic format of the services if these results were to have followed.

Fortunately with the advent of programed instruction, a stimulus was provided that suggested that individual experiences for a large number of students were possible. Following some of Skinner's techniques, and the example of another college program that had been experimenting with self instructional materials, it was decided in 1962 to abandon the group program. Accordingly in the summer of 1962 materials were prepared, administrative procedures established, and the new program commenced in the Fall term.

Essentially two assumptions underlie the program which has been in operation since that date. First, individualized treatments under counselor supervision are superior to group teaching procedures in treating students of widely varying needs. Second, the programed and self-instructional materials in the Center do actually teach the skills for which they are intended.

The student may come to the Center as a referral from a faculty member, another counselor, or in response to an occasional article in the student newspaper. Or he may have heard about the services through another student, at a Freshman Orientation meeting, or as the result of a note included with registration materials. At first contact with the receptionist, the student is informed that services are voluntary, non-credit, without fee and flexible as regards scheduling. Students may enter and discontinue at any time during the quarter.

The student is then referred to the testing service where he fills out a questionnaire concerning family, health, and school background. Also included are questions concerning reading habits, materials in the home, current academic problems, and how the student thinks the Center can best be of service. A diagnostic test battery containing at least one standard reading test and a spelling test is also administered at this time.

Following testing, the student is scheduled for an interview. Staff members, most of whom have counseling experience, have access to Counseling Bureau folders. These will ordinarily include interest, ability, achievement, and personality test scores, transcripts, and notes from other counseling contacts. In consultation with the student, problems are discussed and priorities assigned to the different materials recommended. In some cases the counselor might suggest the student not enter the Center. A two credit reading or study skills course or another personnel service available elsewhere on campus may be more appropriate. Remedial courses in English and Mathematics are also available.

Assuming the student decides to enter the Center, the interviewing counselor then makes up a folder of materials placing it in a file to be picked up each time the student comes in. Interview notes are then forwarded to the counselor who will supervise the student in practice sessions. Most students will be assigned two or three practice sessions weekly.

The counselor, during the sessions, moves about the room, checking the students progress, making suggestions when problems are encountered, and helping them adapt to new materials. Ordinarily about fifteen students will be in attendance at each practice session.

In this program counselors are freed from class preparation and may continually interact with individual students. Original assignments may be easily modified, further interviews scheduled, and continual feedback from the student assured. Notes are maintained on each student's progress and a case review written when the student leaves the Center.

The key to the operation of the Center is a series of self-instructional materials. Some of the materials in the Center have been developed by the staff. Other commercially available materials intended for self-instructional purposes need little adaptation and can be quickly added to our inventory. Other materials require answer sheets and special keys. Some require tape recorders or pacers. Fortunately in recent months more and more materials in programed form are becoming available. Often after evaluation by the staff these can be put into use almost immediately.

Since a program of this type depends to a great extent on materials available, research time is allocated to the improvement.

extension and evaluation of new materials. We are aware of limitations of our materials and have discussed alterations and improvements in our procedures from time to time. As yet we have not evaluated our total program although a study is underway with this purpose in mind. We are convinced, however, that our services are more effective than previously. We have found that we can handle more students with the same staff and space than ever before. We can take students in at any point of time not just the beginning of the quarter and we can work with them for one hour a week or ten depending on what they need. While we are unaware of what the future may bring we are certain that we will not return to totally group oriented methods of the past. A continuation of supervised practice sessions as implemented through self-instructional materials seems more appropriate for the range of students which comes to us. Individual differences can in this manner receive an emphasis and a kind of attention which heretofore our group procedures did not provide.

A Case for University Reading Improvement Programs

Charles M. Brown

University of Southern California

The reading improvement program at the University of Southern California probably does not differ significantly in terms of methods and materials from many other programs throughout the nation. The considerations, however, which have given us pause over the years have been twofold: the selection of students and the philosophical justification for a reading improvement program in a large private and presumably highly selective university.

Because the demand for our services has not been large enough to merit more than one section per semester, we have attempted to instruct all who apply in one group. We have attempted to meet the needs of the entering college freshman and the transfer graduate student for whom English is a second language in the same section. This has meant that we have had to individualize our instruction as far as possible and to make wide use of individual assignments in the lab. This approach, while not entirely satisfactory, has not presented insurmountable difficulties.

A more fundamental problem we face and one which is faced by other institutions of higher learning in the state of California is that of justifying reading improvement programs at the college and university level. Those who challenge our *raison d'être* argue that a university, particularly one which prides itself on being selective of its student body, should *assume* the tools of learning on the part of that student body and should then address itself to the pursuit of knowledge rather than the development of basic skills.

The following item taken from the minutes of a recent meeting of the Board of Trustees of the California State College indicates the nature of the challenge:

A number of the California State Colleges offer remedial courses in English, speech, or mathematics, as part of their curricula. This involves a substantial amount of money and staff time in instruction *that properly may be the responsibility of high schools*. The Academic Senate, at its March, 1964, meeting, adopted a resolution which

recommends that no college credit be given for remedial courses. The resolution further recommends that the cost of these courses be charged to the students, although the question of how much to charge was left open. The Committee agreed with the recommendation of the Academic Senate relating to the granting of credit and will give further study to the question of costs, including the relationship of special fees for remedial courses to the academic needs of various types of students. (2)

This resolution obviously is pointed at "dumbbell English," at other service type courses of a remedial nature and, of course, at reading improvement programs.

In order to think this problem through, it is necessary for us to move back to a definition of education and to an analysis of the role of the college and the university. It is also necessary for us to reexamine the philosophical bases for selection of college and university students—all of which is to ask, "What is higher education?" and "For whom is it intended?"

American higher education departs from the European tradition both as to the broadness of the democratic base of acceptance to the university and as to the nature of what is there undertaken.

With respect to the former, some have asked, "Won't quantity higher education dilute the quality?" Benezet has supplied one answer to a prior question which must first be answered, "What is quality education?"

Anyone who listens even casually to conversations about quality in higher education will come away with a welter of beliefs about what it is. However, definitions of quality education usually break down into three basic categories:

A. Quality in higher education is that which goes on in colleges and universities of the highest educational reputation.

B. Quality in higher education is that which is shown by the brightest students, preparing for the most intellectually demanding professions.

C. Quality in higher education comes from whatever process moves individuals furthest in their attainment of the knowledge, skills, and appreciations which are generally associated with higher education. (1, p. 57.)

He answers the question by stating, "The real battle for quality in college is to bring a greater proportion of students into a greater personal identification with the full dimensions of learning." (1, p. 58) Quality education then means that provision must be made for individual educational needs. This is another way of saying

that the university or college must take students where they find them and help them as far as possible along the road toward worthy educational objectives.

If we accept this point of view, then we must ask two further questions: (1) "What are the purposes of American higher education?" and (2) "Where do reading improvement programs fit into the realization of these purposes?"

Ambrose Bierce has stated that education is that which discloses to the wise and hides from the foolish their complete lack of understanding. Surely the improvement of reading skills helps the foolish become wise and wise increase their wisdom.

Einstein has been quoted to the effect that education is what is left after formal schooling has been forgotten. Surely skills of acquiring information will outlast much of the information so acquired.

McMurrin has asserted a commitment to the individual in education:

But at the foundation of this enthusiastic commitment to the social and national and inter-national ends of education, where we are moved by the aims and purposes that are defined by our large social problems and cultural ideals, there must always be an even more profound and sensitive concern for the individual person. The educational enterprise of a people must ultimately be judged by its effectiveness in cultivating fully the rational capacities of the individual, his critical facilities and his independence of mind, and his abilities for artistic creation and appreciation — by its contribution to his achievement of that intellectual, moral, and spiritual quality of life that describes the proper character and vocation of man. Above all, the nature and quality of a nation's education must be judged by its relevance to its people's personal dignity, their sense of individual worth, and their enjoyment of genuine freedom. (6, p. 11).

How could the aims of a reading improvement program be better stated? One of the fundamental implicit goals of our reading improvement program is the full cultivation of individual rational capacity, critical facility and intellectual independence. We feel that as we help sharpen the tools of learning in our students we are enhancing personal dignity, we are heightening the sense of personal worth and we are helping open the way to a more complete enjoyment of genuine freedom.

Ordway Tead has listed four purposes of a college:

American colleges under all their varied auspices and objectives do have tacitly the common purposes (1) of strengthening personal

creativity; (2) developing the capacity for responsive communication within and beyond our domestic society; (3) advancing a spirit and program of civic, economic, and social cooperation which implies the sensitive and affectionate participation of individuals and special interest groups with each other in an ever widening arc of inclusiveness for striving toward the common good; (4) of working for commitment and dedication to the highest aspirations of the human spirit as we become able to transcend knowledge into that wisdom of God-like values by which we should strive to live. (7, p. 204)

Creativity, communication, cooperation, and commitment — these are the purposes of a college and communication is the key to all of them. To place such a key in the hands of more and more students is the aim of reading improvement programs.

Hutchins has written in somewhat the same tone:

The continuous lifelong liberal education that makes a man a citizen of the world republic of learning and that is indispensable if he is to do his part to bring about the world republic of law and justice is an intellectual discipline that fits a man to solve new problems as they arise, to grasp new facts as they appear, to meet new demands as they present themselves, to remould the environment to make it conform to the aspirations of the human spirit.

The pedagogical content of this education may be simply stated. The liberally educated man must know how to read, write, and figure. (4, p. 95).

But you might argue, does the university need to provide this service. Perhaps as the California State College Trustees suggest, this is the role of the high school. Perhaps it should be the role of the universally available two year post high school program advocated by the Educational Policies Commission in this statement. "Free nonselective colleges, admitting for at least two years of general study all high school graduates who apply, should exist in every population center." (3, p. 58)

To take such an either-or position, however, is to say that reading skills are an entity and that you have them or you don't. Reading skills, however, are of such nature that they can be improved continuously and at any level of schooling. If we accept this observation and agree that the purpose of reading improvement programs at any institution ought to be that of helping the otherwise qualified student get the most out of his educational opportunities, then we can justify such a program at the most mundane trade school and at the most quality conscious university.

Such a position seems justified by this statement from the late President Kennedy:

First, we must improve the quality of instruction provided in all of our schools and colleges. We must stimulate interest in learning in order to reduce the alarming number of students who now drop out of school or who do not continue into higher levels of education. This requires more and better teachers — teachers who can be attracted to and retained in schools and colleges only if pay levels reflect more adequately the value of the services they render. It also requires that our teachers and instructors be equipped with the best possible teaching materials and curricula. They must have at their command methods of instruction proven by thorough scientific research into the learning process and by careful experimentation.

Second, our educational system faces a major problem of quantity — of coping with the needs of our expanding population and of the rising educational expectations for our children which all of us share as parents. Nearly 50,000,000 people were enrolled in our schools and colleges in 1962 — an increase of more than 50 per cent since 1950. By 1970, college enrollment will nearly double and secondary schools will increase enrollment by 50 per cent — categories in which the cost of education, including facilities, is several times higher than in elementary schools.

Third, we must give special attention to increasing the opportunities and incentives for all Americans to develop their talents to the utmost — to complete their education and to continue their self-development throughout life. This means preventing school drop-outs, improving and expanding special educational services, and providing better education in slum, distressed and rural areas where the educational attainment of students is far below par. It means increased opportunities for those students both willing and intellectually able to advance their education at the college and graduate levels. It means increased attention to vocational and technical education which have long been underdeveloped in both effectiveness and scope to the detriment of our workers and our technological progress. (5, p. 4)

I submit that the acquisition of the skills of learning is as important as the content thereof. I submit that those institutions which acknowledge as a part of their purpose an obligation to provide the means for the continual sharpening of such tools, have recognized their true role in our society.

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An Experimental Investigation of the Effect of Instructional Set and Information on Reading Rate

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One of the basic assumptions upon which reading improvement programs are predicated is the idea that since reading speed is a voluntary process, the act of consciously forcing oneself to read faster will result in permanent reading rate gains. This along with several other principles such as eliminating regressive movements, and reducing vocalization form the backbone of many reading courses. Attempts to inculcate these ideas plus supervised practice with or without machines are coupled with motivational appeals to lure the student into developing more effective reading habits. Traditionally, college reading programs of this type have claimed that they improve reading rate without loss of comprehension, and there are many reports in the literature which attest to the positive reading speed gains although few of these use control groups, or test the significance of their results. (2) Most reading programs assess pre- and post- reading skills using standardized tests or locally devised informal measures.

This study undertakes to investigate the effect of instructional set on reading rate, specifically the premise that speed of reading can be increased by instructing a subject to read as fast as possible without loss of comprehension. A second objective is to determine whether information about some of the basic principles or reading stressed in typical reading courses, could, of themselves (i.e., without benefit of a formal course) elicit changes in standardized reading test performance.

Sample and Procedures

The sample consists of 104 upper-division college students enrolled in a course in educational psychology at the University of Maryland. Thirty subjects were male, and 74 female. Subjects were randomly assigned to one of four groups for the first experimental session. Each group was administered two forms of the *Robinson-Hall Reading Test* (Russian History and Canadian History respectively) during this session. They were instructed

to read one test at their normal rate, and the other at a forced speed. The sequence of tests administered and the speed instructions were varied for each of the four groups.

Three hypotheses were tested in the first part of the study:

H₁—There is no significant difference between the average reading rate of subjects instructed to read at their normal speed and those instructed to read fast.

H₂—The sequence with which reading rate instructions are presented does not significantly affect rate scores.

H₃—There is no significant difference between the mean reading rate of subjects on the two forms of the test used.

Results

Table 1 shows the results of the first testing session for the four groups in terms of their mean rate and comprehension scores for each test and the average difference scores.

Table 1

Mean Speed and Comprehension Scores of Four Groups of Students Administered Two Reading Tests Under Different Rate Instructions

FIRST TEST						
Group	N	Inst.	WPM	S.D.	Comp.	S.D.
A	26	Russ. Hist. (fast)	236.7	55.7	70.1	12.9
B	26	Can. Hist. (fast)	245.6	65.9	65.2	8.4
C	26	Russ. Hist. (normal)	229.0	60.6	70.2	13.0
D	26	Can. Hist. (normal)	214.9	62.9	70.0	8.0
SECOND TEST						
Group	N	Inst.	WPM	S.D.	Comp.	S.D.
A	26	Can. Hist. (normal)	205.1	49.7	71.4	11.4
B	26	Russ. Hist. (normal)	227.7	70.9	72.4	12.1
C	26	Can. Hist. (fast)	270.2	61.9	63.9	10.2
D	26	Russ. Hist. (fast)	272.1	76.4	70.7	8.4

To test hypothesis 1, means and standard deviations were computed for the combined groups reading under "normal" instruction and compared with their scores under the instruction to read "fast". As can be seen in Table 2, this hypothesis was rejected at the .001 level since the subjects read significantly faster when told to read fast than when instructed to read at their normal rate. However, the difference between their mean comprehension scores in the two conditions was not significant. (Fast group, Mean = 67.1%; Normal group, Mean = 71.1%)

Table 2
Mean Rate Scores of Students Tested Under Different
Speed Instructions

Normal Rate Instruction			Fast Rate Instruction			Level of Conf.
N	Mean WPM	S.D.	Mean WPM	S.D.	t	
104	219.2	123.0	256.2	129.1	4.215	.0005

Table 3 shows that when subjects were asked to read rapidly on the second test, their rate scores were significantly higher than when the instruction to read fast was given as the first test condition. This finding suggests that there is a practice or "warm-up" effect operating so that perhaps reading a test at a normal rate enhances one's speed on a second reading test. On the other hand, there was a slight tendency for students to read more slowly when the "normal" speed instruction was given on the second test than when it was the set on the first test, although this difference was not statistically significant. This suggests the possibility of a "contrast effect", in that subjects might consciously try to make their second effort noticeably different than their first; however, additional experiments would be needed to confirm this.

Table 3
Comparison of Mean Scores Under Different
Instructional Sequences

N	1st test Condition	Mean WPM	S.D.	2nd test Condition	Mean WPM	S.D.	t	Level of Conf.
52	Fast	241.2	61.2	Fast	271.2	67.8	2.34	.05
52	Normal	226.3	43.8	Normal	221.9	38.4	.53	N.S.
104	Total	231.6	59.1	Total	243.8	46.6		

Mean rate scores on the Russian History and Canadian History Reading Tests were not significantly different (241.4 WPM vs. 233.9 WPM, $t = .819$), thus Hypothesis 3 was accepted.

Table 4 suggests that the correlations between Russian History and Canadian History Reading Tests were higher for the rate scores than the comprehension.

Table 4
Correlation Coefficients Between Russian History and Canadian History Reading Test Scores

Group	Speed	Comprehension
A	.89	.46
B	.75	.48
C	.82	.46
D	.70	.27

For the second part of the study, subjects were redivided into an experimental group ($n = 74$) and a control group ($n = 30$). Following the initial testing session, the experimental subjects were given a handout describing techniques for improving reading speed and told to practice these techniques daily for one hour. The control group was given no materials. Both control and experimental subjects were asked to return for another session one week later.

At the post testing session, all subjects were administered the *Robinson-Hall Art Reading Test* with instructions to read the material as rapidly as they could, and after completing the test answered a questionnaire concerning their reactions to the study. The experimental subjects were asked to report the extent to which they had practiced the rapid reading techniques given them.

Table 5 shows that the experimental and control groups did not differ on the pre-test administered under "fast" instructions on speed or comprehension.

Table 5
Comparison of Speed and Comprehension Scores of Experimental and Control Subjects on Pre-Test Taken Under Speed Instructions

	N	WPM	Comprehension
Control Group	30	258.4	65.8
Experimental Group	74	255.3	67.6

A comparison of the scores on the post-test (Art Reading) with those on the pre-test taken under the "fast" speed conditions

revealed that the experimental group gained an average of 48.7 WPM compared with an average increase of 27.6 WPM for the control group ($t = 2.24$, significant at the .05 level of confidence). Mean comprehension scores were not significantly different between the experimental (67.8%) and the control group (69.9%). Thus, giving students a handout describing techniques for improving reading rate and admonishing them to practice daily for a week, resulted in significant improvement in reading rate in comparison with the control group with no change in comprehension.

In order to ascertain what effect the instructions to practice had on improvement, the experimental group was further divided according to how frequently the subjects reported they had practiced the methods during the week between pre- and post-testing. Table 6 shows the mean scores of three divisions of the experimental group and the control group.

Table 6
Mean Pre- and Post- Speed Scores for Groups Reporting Varying Amounts of Practice

Group	Frequency of Practice	N	WPM Pre-test	WPM Post-test	S.D.	Mean Difference
I Experimental	"Tried it once or twice"	28	250.1	273.8	70.7	+39.8
II Experimental	"Tried it three or four times"	33	265.9	333.2	59.5	+67.3
III Experimental	"Tried it every day"	13	255.2	271.5	65.3	+20.7
IV Control Group		30	258.4	284.9	71.9	+23.6

Statistical analyses revealed that Group II had significantly higher post-test speed and greater gains than any of the other groups. Subjects reporting that they practiced the techniques 3 or 4 times showed significantly higher speed scores and greater improvement than groups who reported they practiced everyday, or those who indicated they practiced once or twice. (t significant at .01 level). The latter groups were not significantly different from the control group in post-speed scores or in mean gains.

It is interesting to note that the group that claimed to practice most faithfully made the lowest speed gains of any group. The comments these students made on the post-questionnaire yield some clues to this phenomenon. They wrote statements like, "I tried it every day, but with little success", "I always read that way and can't see how your method is different", or "It just doesn't work although I kept at it". These comments suggest that this group who stated they practiced regularly but failed to improve may be analogous to the compulsive students in our reading courses who attend regularly, practice diligently (in their own way), resist change, and make lower scores on our post-tests.

On the other hand, there were four students in the control group who showed sizeable speed gains on the post-tests (reading 150 or more WPM faster than their previous rate.) All of these students had failed to follow directions on the first testing session (i.e., when told to read at their "normal rate", they increased their speed.) Their comments suggest that they felt they had performed very poorly on the pre-tests. For example, one student said she felt she was rusty on taking reading tests and wanted to prove that she was a good reader. These students appear to respond to their own needs, rather than the experimenter's instructions. Had their scores been excluded from the study, the differences obtained between the control group and the experimental subjects would have been even greater.

Conclusions

In summary, this study has shown that instructing students to read faster on a standardized test results in significantly faster reading rate, and further suggests that reading test speed increases as a function of a warm-up period. Although neither of these ideas are new, little systematic attention has been focused on calculating normal vs forced reading patterns of students starting reading courses. One implication of our findings is that reported gains in reading rate as a result of a course may be mere artifacts—since the student's initial speed potential (i.e., how fast he could read by forcing himself) is not known. Perhaps the only thing that he learns in a reading program is that it's all right to read fast on tests. At any rate, our evaluations would be more meaningful if we were concerned with assessing initial skills more adequately.

Second, the fact that students who were willing to read a handout on improving reading rate and try the techniques "3 or 4

times" showed significant reading speed gains suggests that change in reading may occur more quickly than we think, and raises questions about the role of practice in changing reading patterns. This result has implication for studies such as that conducted by Lafitte who found significant improvement in students' reading scores midway through the course, but no improvement in the last half. (1) This suggests that we need to investigate the optimum length of a reading program—perhaps one session will be enough to change reading patterns. Another interpretation of the findings suggests that perhaps we had best look for more adequate criteria by which to evaluate our services.

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A Study of Attitudes Toward Certain Aspects of Reading Expressed by Parents of Inferior and Superior College Readers

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College students report that in many of their classes they are unable to understand the ideas expressed by their instructors. They say, "Our teachers talk over our heads and use words which we do not understand." A study of over one thousand college freshmen indicates that 56 per cent have difficulty in interpreting the information presented to them in lectures and in their textbooks. Why do our students have this difficulty? Is their background inadequate? If so, to what extent is the home responsible for their lack of mental content? The home *can* produce a climate favorable to the development of language skills. Recently, for example, a little girl entering the first grade was heard to say when given a package of M and M's, "I shall wait until after lunch to eat these for candy is such a concentrated food." The child's father is a teacher of chemistry and her mother is a dietician. This little girl can understand and use correctly such terms as *calorie*, *protein*, *carbohydrate*, and *weight control*. Her home is building mental content in the field of science. In general, research seems to substantiate the inference that there are differences between the parents and home environments of superior and inferior readers. McGinnis (2) in a recent study of boys and girls in the seventh grade shows that parents of superior readers express attitudes which suggest that they place a greater emphasis upon the importance of reading, that they encourage the development of language skills and that they foster the development of background more than parents of inferior readers. It is the purpose of this investigation to determine whether or not similar attitudes are found on the part of parents of superior and inferior readers at the college level.

In this study it is postulated that mothers and fathers of superior readers express attitudes which suggest that (1) they emphasize the importance of reading, (2) they encourage the development of language skills, and (3) they foster the development of experiential background to a greater extent than mothers

and fathers of inferior readers. In order to evaluate these attitudes the *Reading Attitude Inventory* developed by McGinnis (2) has been employed.

Description of Reading Attitude Inventory

The *Reading Attitude Inventory* consists of three scales each designed to measure a specific attitude. This instrument has been constructed and patterned after the well known and successful *Parental Attitude Research Instrument (PARI)* prepared by Schaefer and Bell (3). The scales making up *RAI* are:

1. **Triviality of Reading.** Each of the five items in this scale is designed to reflect an attitude which suggests that parents consider reading to be relatively unimportant and of limited value.

2. **Hindering Development of Language Skills.** Each of the five items making up this scale reflects an attitude which discourages children from asking questions, expressing ideas, or listening to what others have to say.

3. **Restriction of Childhood Experiences.** Each of the five items making up this scale reflects an attitude which favors holding children back from participating in activities which provide information, ideas and experiential background.

A sample item of each scale is shown.

Time set aside to read is not essential to success in homemaking.

Most children ask questions merely for the purpose of having something to say.

Children today have too much freedom to go places and do things.

Scoring

A value of 4 points is given for a response which indicates a strong agreement, 3 points for mild agreement, 2 points for mild disagreement, and 1 point for strong disagreement. A scale score is obtained by finding the sum of the item weights. A high score reflects an attitude in the direction of the title of the scale. For example, a high score on Scale 1, *Triviality of Reading*, suggests that the individual completing the inventory places little value upon reading.

The internal consistency, test-retest reliability and index of reliability are shown in Table 1.

Table 1
Reliability of Reading Attitude Inventory

Scale	Internal Consistency	Test-Retest Reliability	Index of Reliability
I	.89	.80	.89
II	.90	.86	.93
III	.89	.87	.93

These data are based upon scores provided by 100 mothers.

Intercorrelations of scale scores are .12, .12, and .61.

In view of these facts RAI has been selected for investigating differences in attitudes between two groups of parents in regard to certain factors contributing to reading performance.

Procedure Followed In Making Study

In making this investigation superior readers were defined as those students scoring above the 75th percentile as determined by scores resulting from the administration of the *Iowa Silent Reading Test* and inferior readers were defined as those students scoring below the 25th percentile. Individuals utilized in this study were enrolled as regular and full-time students in two universities, one in Michigan and one in Texas. Students were selected from freshmen and sophomores to make up the group of superior readers and to make up the group of inferior readers, after consideration of several factors. In as far as possible, the two groups were equated as to number, sex, age, and classification in the university. No attempt was made to control such factors as mental maturity, scholarship, economic status of family, cultural level and religion. After the two groups of 50 students were complete, attention was immediately focused upon the 100 parents of superior readers and the 100 parents of inferior readers. These parents were asked to complete the *Reading Attitude Inventory* which was made available to them through the mail. Six additional parents of both superior and inferior readers were contacted in order to compensate for refusals, incomplete data, and for the parents who had children who were good readers and children who were poor readers. Finally, data were complete from 100 parents of superior readers and from 100 parents of inferior readers.

Following the administration of the *Reading Attitude Inventory* to parents, responses on each scale were scored, and mean scores were determined for each group included in the study. The mean scores of mothers of superior readers were compared with the mean scores of mothers of inferior readers. The mean scores of fathers of superior readers were compared with the mean scores of fathers of inferior readers. The F test to determine homogeneity of variance and the appropriate t test of significance were applied.

Table 2
Differences Between Mothers of Superior Readers and Mothers of Inferior Readers as Determined by the Reading Attitude Inventory

Scale Number and Title	Mothers of Superior Readers Mean	Mothers of Inferior Readers Mean	F	t
1. Triviality of Reading	8.38	12.46	2.54	7.73
2. Hindering Development of Language Skills	8.82	13.14	2.18	8.53
3. Restriction of Childhood Experiences	10.30	15.58	1.00	9.34

Table 3
Differences Between Fathers of Superior Readers and Fathers of Inferior Readers as Determined by the Reading Attitude Inventory

Scale Number and Title	Fathers of Superior Readers Mean	Fathers of Inferior Readers Mean	F	t
1. Triviality of Reading	8.98	12.66	1.71	6.83
2. Hindering Development of Language Skills	9.06	14.26	1.01	10.86
3. Restriction of Childhood Experiences	10.26	15.22	1.02	8.48

Table 4
Educational Levels of Parents

Grade Level	Parents of Superior Readers	Parents of Inferior Readers
17	13	4
16	10	3
15	10	1
14	5	9
13	10	6
12	36	27
11	3	14
10	1	13
9	2	5
8	8	9
7	2	4
6		3
5		
4		2
Total	100	100
Mean	13.02	11.14
Variance	7.11	7.23

$r = .96$

Summary of Data

Table 2 shows the mean scores of mothers of superior readers and mothers of inferior readers on the *Reading Attitude Inventory*. Table 3 shows the means of fathers of superior readers and fathers of inferior readers on the *Reading Attitude Inventory*. These tables are similar in most respects. It is evident that mothers and fathers of superior readers differ significantly from mothers and fathers of inferior readers in their attitudes toward the value of reading, the development of language skills, and the building of background. In summarizing these differences it may be pointed out that fathers and mothers of inferior readers express attitudes which suggest that reading is relatively unimportant and of limited value; that children should be discouraged from expressing their ideas and that children should be restricted from participating in activities which can provide information and experiential background related to reading and language development.

The educational levels of parents participating in this investigation are shown in Table 4. The range for parents of superior readers is from grade seven to graduate school with a mean of 13.02 grades completed. The educational level of parents of inferior readers range from grade four to graduate school. The mean is 11.14. The difference in mean educational levels of parents is significant at the .01 level.

Inferences and Conclusions

It is obvious that as far as this investigation is concerned, the three postulates made at the beginning of this report can be accepted with confidence. It has been shown that fathers and mothers of superior readers express attitudes which suggest that (1) they emphasize the importance of reading, (2) they encourage the development of language skills, and (3) they foster the development of experiential background to a greater extent than fathers and mothers of inferior readers. This study suggests that there is a marked contrast, in as far as these attitudes are concerned, between the homes of superior and inferior readers. These differences in attitudes suggest differences in kind and degree of mental content which students in this investigation have had an opportunity to acquire. The educational level attained by the parents appears to be associated with parental attitudes toward reading. It is unknown whether or not educational attainment is a contributing or a concomitant factor in the performance of the parents participating in this study. Many questions can be raised. To what degree is the *Reading Attitude Inventory*, in itself, a test of reading ability? Were the parents, limited in their educational attainment, able to interpret and evaluate the items effectively? What is the relationship between educational levels and attitudes toward reading? If this relationship exists to a limited degree, how can attitudes be changed? Before these questions can be answered there is much to be learned. Surely, the *Reading Attitude Inventory* can be used as an effective tool for further investigation.

The importance of background and mental content are suggested by data resulting from this investigation. The student sees with what he has seen and hears with what he has heard. Mental content will affect his thinking, his doing, and his feeling. Meaning in any situation, listening or reading, is dependent upon mental content. This fact, in the opinion of the writer, is a partial explanation of why a large percentage of our college students have

difficulty in *identifying*, *interpreting*, and *evaluating* the concepts expressed in their classes and in their textbooks. Their perceptual quotient (PQ) is quite inadequate. This situation deserves the attention of college teachers and those who prepare textbooks designed for undergraduate students.

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Motility Training

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Educational Developmental Laboratories

Introduction

Educational Developmental Laboratories is in the process of developing a method for training visual motility, which can be defined as the ability to make ocular excursions with facility and competence. This report will describe the projected training techniques and some of the initial exploration of the possibilities of this technique.

Background

The intellectual aspects of reading necessarily interact closely with the visual aspects. The efficiency of the visual-functional processes determines to a great extent whether or not the reader will be effective in gaining meaning from the reading activity. For perspective, it should be noted that motility is only one of several factors which are fundamental to successful reading; others are visual acuity and accommodation, binocular coordination, and fusion.

The role of visual motility as a factor influencing success in reading has been pointed out by such investigators as Bing (1), Eames (2, 3), Good (4), Gould, Henderson and Scheele (5), Imus, Rothney, and Baer (6), Kephart (7), Robinson and Huelsman (8), and Taylor (9).

Visual training, aimed in part at the improvement of visual motility, is conducted by hundreds of eye specialists. Training to develop visual motor skills is under way in some public schools; for example, the Brentwood, Long Island schools give such training to several classes of kindergarten and first grade pupils (5). It was felt that a training technique should be made available so that motility training could be given to more children, as needed, particularly in the early grades.

The visual motility training technique, as being developed, is based on the hypothesis that specific and regular training designed to improve visual motility will result in improved binocular coordination and fusion and greater accuracy of fixation, which in turn will improve the potential for more orderly directional attack

and better physical adjustment to the near-point act of reading. Experimentation is now under way to measure the effect of motility training on success in learning to read; other experiments will probe the effect of such training on slow and retarded readers in the upper grades.

The Training Technique

Certain prerequisites were considered fundamental in the planning of the training method. It must produce excursions which are similar to those used in the reading activity. It must be flexible enough to be used with students on all levels. It must be easily usable by a classroom teacher with groups of students under usual classroom conditions.

The technique as now designed involves the EDL Controlled Reader and a set of fifteen filmstrips.

The Controlled Reader has a number of advantages for motility training: It offers left-to-right presentation and a wide and easily variable speed range suitable for training students on various levels. As a group training device, it permits the training of motility at far point, which keeps vergence demands at a minimum. (It should be noted that the EDL Controlled Reader Jr. offers the potential of individual near-point training.)

The training filmstrips contain only single numbers, single letters, and simple lines and curves, items which can be recognized easily by children without a great deal of school experience. These symbols have the advantage of requiring a similar retinal resolution and zonal correspondence to the symbols encountered in reading. The symbols are placed three to a line, so that only one is visible at a time as the Controlled Reader's slot moves from left to right.

The training task requires the student to look for a given number, letter, or symbol, and to count the number of times it appears in a given exercise. The speed of presentation is adjusted to challenge but not to overtax the motility and recognition capability of the trainee. Projection speeds are chosen to present each symbol for an interval of time which is related to the trainee's usual duration of fixation.

The Study

Initial Experimentation. The experiment being described in this report is one of several being carried out to determine the parameters of the training method. Specifically, its purpose was

to determine how individuals of varying ages would perform in and react to the training technique. Performance during training was recorded with an eye-movement camera in order to determine the relationship of visual motility with performance during the activity of reading.

Subjects. Thirty-one subjects were involved in this exploration. Five ranged in age from 7 to 10; seventeen were between 11 and 20, and nine ranged from 21 to 55. Subsequent investigations will involve more subjects at each level, particularly in kindergarten and first grade.

Procedure. Subjects were seated 17½ feet from the projection screen, a distance which approximates that of the central student in a standard 30 by 30 classroom.

Filmstrips were projected on a matte surface screen by the Controlled Reader. The total projection slot measured 46 inches in width, with 21 inches intervening the numerals from center to center. It was determined that this would require an ocular movement of 6 degrees and 28 minutes from numeral to numeral. Under this condition, a subject fixating on any given numeral would see the adjacent numeral with 25% or less acuity. This would require the subject to make distinct movements from numeral to numeral in order to recognize each with sufficient accuracy. Further experimentation is needed to determine the optimum distance between numerals and size of numerals.

The testing procedure had three parts. Subjects were photographed with the EDL Reading Eye camera on all tasks.

1. The subject read a selection appropriate to his reading level from the file of cards used in the *Eye Movement Photography Test*, and answered questions to establish his comprehension at 70% or above, indicating actual reading.

2. The subject took the Motility Dots test of the *Oculo-Motor Pre-Reading Performance Test* (10), now under development at EDL. The test card shows two dots, 3½ inches apart. The subject is directed to look from one dot to another as fast as possible, for a measured interval of 10 seconds.

3. The subject was exposed to motility training with three numerals per line, at speeds of 60, 70, 80, 90, 100, 110, and 120 lines per minute. At 60 lines per minute, the total exposure time for each line of print was one second, allowing an estimated third

of a second for each of the three numerals. At 90 lines per minute, the exposure time per numeral was .22 second, while at 120 lines per minute, exposure time per numeral was reduced to .17 second.

Subjects were asked to count and report the number of times a given number appeared; for example, 9's at 60 lines per minute, 5's at 80 lines a minute, and so forth.

Thus nine eye-movement photographs were taken for each individual.

Treatment of data. The eye-movement photographs were then analyzed as follows:

1. The reading graph was analyzed in the standard manner, counting fixations and regressions, determining rate, and computing span of recognition and duration of fixation.

2. The motility dots test was analyzed by counting the number of fixations and excursions made during 10 seconds and computing the number of fixations per excursion and the duration of fixation.

3. In analyzing the graphs taken during motility training, the activity for 10 lines of print was isolated for purposes of comparison with the activity in reading 10 lines of print. Fixations and regressions were counted and durations were computed. Accuracy in reporting the number of numerals seen was noted. Graphs were also inspected for evidence of staring or disorganization.

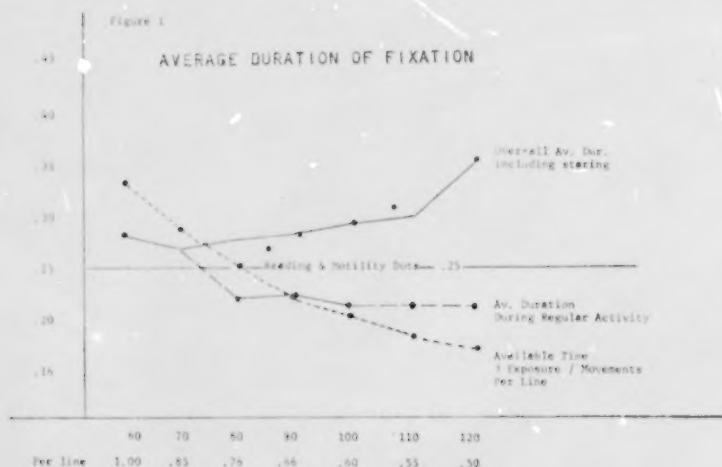
Results

It was felt that the best index of ocular activity for purposes of comparison was duration of fixation, or the average length of the eye pause. How similar were the average durations for reading, for the motility dots (with no external control on the subject), and for the motility training situation (during which the subject was paced).

It was found that the average duration for reading and the motility dots was the same — .25 of a second. At first glance, this would appear somewhat curious, since in the reading of the test selection, the subjects were not attempting to control their ocular activity, and in the motility dots test, they were told to move back and forth as many times as possible. Perhaps this similarity was caused by the fact that the 3½ inches between the dots required

the subjects to expend considerable energy, and this in turn had the effect of prolonging their pause time.

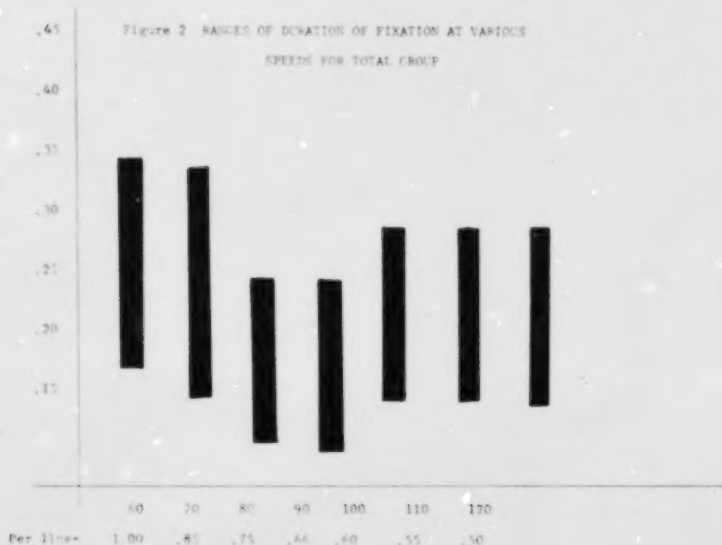
How this average duration compares with the durations under the paced conditions of motility training is shown in figure 1.



Average duration (represented by solid line) was .275 second at 60 lines per minute, declined slightly at 70 lines per minute, and then increased gradually, increasing to .351 at 120 lines per minute. When the exposure time (represented by short dashes) was greater than the usual reading duration (at speeds 60 and 70), the subjects' duration was shorter than the available time. At speeds where the exposure time equalled or was less than the usual duration time, the average duration appeared to become longer and longer. Inspection of the graphs revealed, however, that this apparent lengthening of duration was, in fact, a result of intermittent prolonged pauses or staring, which evidently occurred when subjects could not keep up, and had to wait to get started on another line, or in other ways compensated for their inability to keep up.

It became apparent that it would be desirable to determine the duration periods of regular left-to-right activity. For most of the subjects, it was possible to isolate short periods of regular activity, and durations were obtained for these periods. Averaging these durations for the various speeds did, in fact, show that the subjects

continued to shorten their duration (see long dashes in Figure 1). At 90, the actual duration approximates almost exactly the exposure time of .22 second. From that point on, even though exposure time continued to increase, duration did not drop below .21 second. Many of the subjects simply could not reduce their duration below this point.



In examining the range of duration, as shown in figure 2, at the various speeds for the total group, it was interesting to note that the shortest durations occurred at 80 and 90, where inspection of the graphs shows that most subjects were performing most efficiently. Note also that the range didn't change appreciably at the higher speeds, at which subjects were not able to change their durations.

The incidence of long pauses and disorganization was also studied.

At 60 and 70 lines per minute, 5 out of 31 subjects were staring less than $\frac{1}{2}$ of the time. At 80, 13 were staring less than $\frac{1}{2}$ of the time, and 3 began to stare more than $\frac{1}{2}$ of the time. At 90, this difficulty increased, and certain subjects went into a random or disorganized pattern in which there were evidences of lack of

lateral or vertical control. Difficulties of this sort increased with advancing speeds.

The range of duration for each individual subject for reading of motility dots, and for motility training at 90 lines per minute was also determined. The greatest range was .09 of a second, and the smallest was .02 second. Of the 29 subjects charted, 16 showed the longest duration for the reading selection, the other 13, for the motility dots. There was no consistent tendency to maintain the shortest duration on any one activity, though most showed this on the motility training.

It was quite unusual to note that the shortest duration noted on all of the graphs was .339. This is approximately .02 shorter than the shortest duration reported in the literature by Walton (11). This can undoubtedly be attributed to the fact that this was measured under paced conditions, while Walton's measurements were taken when the individual paced himself.

The last factor to be studied was accuracy in reporting the numerals seen.

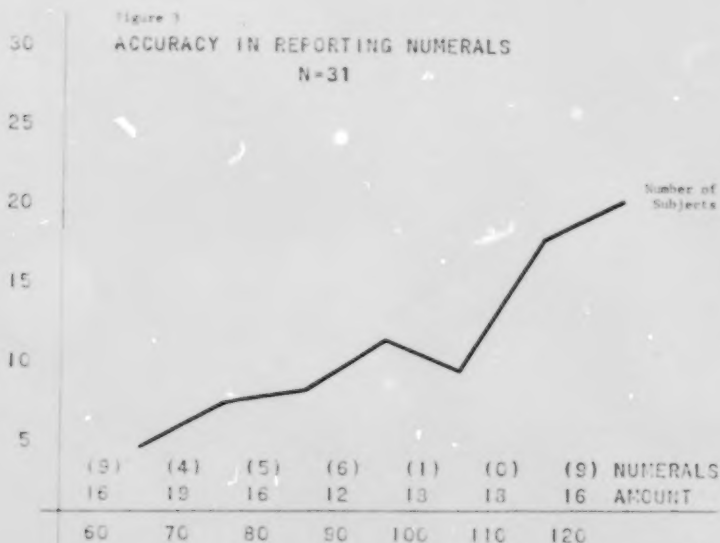


Figure 3 shows the number of subjects who reported an incorrect amount of numerals at given speeds. One would expect inaccuracy to increase with speeds. It was felt that there were two

factors which disturbed the consistency of this graph—the lower number of 6's to be counted at 90, and the seeming ease in counting 1's, which was noted by a number of subjects.

There are no absolute conclusions which can be drawn from a study of this sort, for its purpose was primarily to add to the existing knowledge about the activity of the eyes during reading and reading-related activities, and the manner in which their performance can be influenced by external means, and to gain insight into other factors to be studied.

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Eye Movements and Rapid Reading Reconsidered

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Stanford E. Taylor's newsletter, *Eye Movements and Reading: Facts and Fallacies*, (6) is certainly well titled. It discusses eye movements and reading, and it contains facts and fallacies. Unfortunately not all of the fallacies are so labeled. In general, the newsletter attempts to prove that rapid reading is impossible. Taylor defends this thesis by reference to the findings of research using the Reading Eye camera.

I believe that this attack on rapid reading is invalid for a number of reasons. First, my own experience has shown me that rapid reading is both possible and teachable. Second, Taylor's definition of reading is faulty and leads to erroneous conclusions. Third, findings on the Reading Eye have nothing to do with rapid reading. Fourth, other research proves that rapid reading is both possible and teachable. Fifth and finally, other research in eye movement photography, when properly related to rapid reading, also proves that rapid reading is possible.

First, I would like to relate my experiences in teaching rapid reading. This is the third year that I have taught rapid reading and English at the University of Santa Clara. Each term, new students enter my rapid reading courses. Each term those with at least normal vision and normal reading ability—that is, those who score over the fortieth percentile on either the *Iowa Silent Reading Test* or the *Nelson-Denny Reading Test*—finish the course reading at high rates of speed. The average reader after completing my course can read material from the *SRA Reading Laboratory IVa* at the thirteenth and fourteenth grade levels at rates between 500 and 2,000 words per minute with 80% or better comprehension. The fastest that any one student has read this material was 4,000 w.p.m. with 90% comprehension. These students also read most novels and many texts in the social sciences at a rate between 1,200 and 2,500 w.p.m., and here the record is 6,000 w.p.m. with excellent comprehension.

In addition, at the end of each course, the students are tested on alternate forms of the *Iowa Silent Reading Test* or the *Nelson-*

Denny Reading Test. Almost all of the students, some ten after semester, scored at the ninety-ninth percentile in speed, and their comprehension and vocabulary scores rose from ten to fifteen percentile points over their pre-test scores. This experience contradicts Taylor's findings on the Reading Eye.

Secondly, Taylor's definition of reading is faulty and leads to erroneous conclusions. On page thirteen of the newsletters, we read, "... one must first clarify what is meant by 'reading.' If one is referring to the act in which the reader contacts all of the words visually and strives for complete comprehension, reading rates of thousands of words per minute are impossible." (6, p. 13).

What is meant by "contacts all of the words visually?" Taylor seems to mean that the reader should look at each word separately, or at least in groups no larger than "2.7 words per eye movement." (6, p. 13) He quotes Feinberg (3) to suggest that seeing any larger group of words is impossible. Feinberg's study shows that the acuity of the eye falls off rapidly from the foveal vision so that at an angle of 5 degrees, the acuity is only 25%. But Feinberg does not answer one important question: how much acuity is needed for reading? I believe that much less acuity is needed than is generally realized.

One reason why less than 100% acuity is needed in most reading is that our gathering of meaning from the printed page is highly dependent on context. Anticipatory techniques, such as pre-reading, or overview reading, or surveying the printed material, help the reader form some ideas about the context before he starts reading. These techniques, which incidentally, are not available to the subject of Reading Eye Photography, allow the reader to anticipate what is coming, and thereby help in the rapid perception of both ideas and details from the text. As long as the material is not too difficult and as long as the context does not change too violently or too suddenly, the material can be read rapidly. Whenever a major shift in the context takes place, the reader should slow down.

Context is important not only in rapid reading, but in all reading. Those who use the EDL Tach-X know that almost all students can perceive and remember several times as many letters in phrases which make sense, as they can digits in a series of random numbers. Most of my students have great difficulty reading eight numbers on the tachistoscope but have little trouble with phrases

of twenty letters. The phrases have context, the random numbers do not. For these reasons, I believe that context is as important as visual acuity, and that the better the context, the less acuity is needed in reading.

Again, Taylor seems to think that a reader can see only in a slit along one line of print, and that his peripheral acuity of 50% or more cannot reach the line above and the line, or lines, below the point of fixation. I believe that common experience, the results produced by rapid readers, and the work on Square Span done by Robert B. Andrews (4), and Feinburg's study (3) show conclusively that a reader can take meaning from the line above and the line below as well as the line being looked at directly.

For these reasons I believe that the rapid reader aided by context and using his peripheral vision does contact each word visually, and that the limit of 2.7 words per fixation is meaningless when discussing rapid reading.

In his definition of reading Taylor also stated that the act is not reading unless the subject "strives for complete comprehension." Nobody objects to the subject "striving" for comprehension, but striving is not reading. I do not test my students on their efforts, but on the results they produce. Non-readers can strive and strive, and still not read.

On the other hand, if Taylor is suggesting that the rapid reader does not "strive for complete comprehension," he is mistaken. Not only does the rapid reader strive for complete comprehension, but he approaches its attainment more often than does the average reader on whom Taylor likes to dwell. We will discuss the superior comprehension of the rapid reader later.

If Taylor's definition is invalid, what is the definition of reading? I believe that reading is the act of gaining meaning from the printed page. Reading is comprehension. Thus we gauge how effective the reading act is by testing the reader's comprehension. Whenever the comprehension is high, the reading act has been effective, and we can say the subject has read. Whenever the comprehension is low, the attempted reading act has been ineffective, and the subject did not read. This is not a new idea. Tinker (9, p. 10) has stated, "The only justifiable or valid definition of 'speed of reading' is 'speed of comprehension.'" When this definition is accepted, the rapid reader who produces a good comprehension score proves that rapid reading is possible.

Third, let us ask what the results of Reading Eye photography tell us about rapid reading. The answer is, in a word, nothing.

There are two meanings that can be assigned to the term "rapid reading." In general we may say that a person is reading rapidly when he comprehends the meaning of a printed work as quickly as most trained readers. For example, a rate of 100 w.p.m. in reading Shakespeare's sonnet, *Tired with All These*, might be considered rapid.

But this meaning of the term would be too relative and too general for our discussion. For the remainder of this paper, I will use "rapid reading" to mean gaining meaning from the printed page at a rate of 1,200 or more words per minute. I will place no upper limit on the reading rate although I have not yet had a student who has read over 6,000 w.p.m. with what I considered good comprehension. I have not taught many students who could read over 3,000 w.p.m., but almost all of my students do become rapid readers.

Of course rapid reading is not used on all kinds of material. As an English professor, I teach my students how to read different kinds of material in different ways. Poetry should be read aloud, several times, with very close scrutiny of the individual words and phrases, but I would rarely, if ever, expect my students to read a novel this way. The kind of comprehension demanded by a poem differs from that demanded by a novel, and certainly any test of comprehension should reflect this difference.

For these reasons, poetry is read slowly, but most novels and many textbooks, especially in the social sciences, can be read rapidly. Works of what is generally called practical prose may or may not be read rapidly depending on their vocabulary, concept load and style. If the vocabulary is new or unfamiliar, if there are many ideas or many facts per page, or if the style is unfamiliar or involved, the work must be read slowly.

What kind of material does Taylor's Reading Eye present to the readers? After the subject has placed his head in a kind of brace, he is asked to read twelve lines of print. Each line contains ten words. Only the middle ten lines are used in the test. After reading these ten lines, the subject is asked to answer ten comprehension questions, or one for every ten words. The trained reader will seldom rapidly read a selection which contains so many

important facts that a question can be asked for every ten words of text. Also in reading these ten lines, the reader is not allowed to use his usual anticipatory techniques. He is also prohibited from using his finger under the line or his hand down the page, both of which many rapid readers use in most of their reading.

Since the material read on the Reading Eye is not the kind which is normally read rapidly, and since the reader cannot use his normal reading techniques, it is safe to say that the Reading Eye tells us nothing about rapid reading. It certainly does not prove that rapid reading is impossible.

Fourth, other research proves that rapid reading is both possible and that it can be taught. At the 1962 IRA convention, Moore (5, p. 204) reported, "In general, skimmers fixate fewer times, take less time and *scores as well, or better, on comprehension tests* than do the fast readers, the normal readers and the slow readers." (Italics mine.) If their comprehension is as good as or better than that obtained by fast, normal or slow readers, why is it not reading? Since reading is comprehension, his "skimmers" are really rapid readers because they comprehended what they read. This vindicates rapid reading in spite of the attacks of Taylor.

Moore also told me that when he taught most of his average readers to "skim", their comprehension scores rose. Since the object of reading is to get meaning from the printed page, and since his students comprehended better when they read rapidly, it should be obvious that rapid reading is possible and can be taught.

Adams (1) has also reported on twelve "supernormal readers". He defines "a supernormal reader" as, "any individual who performs on Form A or B of the Survey Section: Upper Level, Diagnostic Reading Test at or above 1,500 words per minute with comprehension at or above 70 per cent." (1, p. 137-8) Judging from their "pre-training" and "post-training" scores, these twelve people learned to read rapidly during a developmental reading program. Again here is evidence that rapid reading is both possible and teachable.

Dew (2) also reports the results of a reading course in which students learned to read rapidly with good comprehension. Wood (10) reports similar success. Now Taylor seems aware of these or similar results when he states in another article (7, p. 100), "Interestingly enough, many proficient skimmers can attain comprehension scores that rival scores obtained by others who are reading

inclusively." I say that if the rapid reader who Taylor calls a "skimmer" has better comprehension than the inclusive reader, then the rapid reader is also reading more inclusively.

After the sentence just quoted, Taylor says, "This is not to suggest, however, that skimming and scanning can replace inclusive reading, for it is almost a certainty that most people cannot master this highly elusive and demanding skill." First, I would point out that rapid reading, with high comprehension is truly inclusive reading. And second, the experience of Moore and myself, and of others who teach rapid reading, indicates that most normal readers can master this skill.

Finally, other research in eye movement photography proves that rapid reading is possible. Thomas (8) used a head-mounted camera so that his subject, "a professor holding a Ph.D. degree," could use all of her normal reading techniques on material suitable for rapid reading—in this case a "semi-technical book on the problems of space travel." (8, p. 105) During the test period she read at a rate of about "10,000 words per minute" with "good comprehension." Since her comprehension was good, we may say that she was reading. And the rate was certainly rapid. Thus we see that eye-movement photography, when properly used on suitable material proves that rapid reading is possible.

In summary, we have seen that in my experience rapid reading is both possible and teachable. We have seen that Taylor's definition of reading is faulty and that his findings on the Reading Eye cannot lead to any valid conclusions about rapid reading. We have also seen that other research, with and without eye movement photography, has proved that rapid reading is possible.

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Rebuttal to Paper "Eye Movements and Reading Reconsidered"

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I believe that Mr. Smith's paper is more of a statement of the aspirations and desires of an enthusiastic instructor than a report of the findings of research, for there is no actual documentation to support his statements about speed reading, nor do his references indicate that eye-movement photograph cannot yield a valid record of the performance efficiency of an adult involved in any form of reading.

It would appear that the major points stated or implied in Mr. Smith's paper are as follows:

1. That most readers can be taught to read at 1,200 words per minute or above with improved or sustained comprehension over more conventional rates.
2. That comprehension alone can be used as validation of rates.
3. That all reading approaches (excluding poetry) are similar in nature except for variations in rate.

Smith's references to the EDL Newsletter, *Eye Movements and Reading: Facts and Fallacies*, and to what he misinterpreted as my definition of reading are of little consequence in relation to the above points. Let's explore each of these points in greater depth.

1. There is no real substantiation in the references cited to indicate that almost everyone can be taught to read inclusively at rates of 1,200 words per minute or better. Certainly, the results of hundreds of reading courses being conducted today would suggest that these results cannot be typically achieved. Those who are well informed concerning visual coordination and motility would support the view that approximately one-third of our population without being given specific visual training could not read at accelerated rates without an extraordinary expenditure of energy and, in many cases, actual ocular discomfort. Then, too, there are personality differences to be reckoned with. Those students who are rigid or compulsive and in other ways driven to maintain a high degree of accuracy find it difficult, if not impossible, to attain high reading rates and to develop a skimming capability. 1

quote Moore (8), who was cited by Smith, "In short, certain personality types cannot bring themselves to skim."

2. Mr. Smith has stated in informal discussion at this meeting that he is quite dissatisfied with the present measures of comprehension, yet he maintains that comprehension is the only real and meaningful gauge of reading competence at extremely high rates of coverage. I would agree that comprehension measures can be used to measure a reader's *effectiveness* or his ability to understand and to satisfactorily complete an assigned reading task as directed, but cannot agree that comprehension is the only measurement of the quality of reading. There is the consideration of *efficiency* or the nature of the perceptual activity employed by the reader while carrying out the reading act. Eye-movement photography provides us today with the sole means of measuring reading efficiency. The quantity and quality of ocular activity has been shown to be a valid and reliable indication of the efficiency of reading performance, by the studies of Tinker (15), Gilbert (5), and Taylor (12). The efficiency of reading performance has, in turn, been shown by such investigators as Buswell (1) and Gilbert (3), Taylor (10) and Taylor (13), to correlate highly with reading and educational accomplishment. In this day and age it would seem essential that reading proficiency be judged both from the standpoint of *efficiency* as well as *effectiveness*. It is important to realize that Smith's students and those in the Adams, Dew, and Wood study were not measured in terms of their efficiency, but solely on the basis of rate and comprehension measures.

Do Smith's readers and the other readers cited in his paper maintain equal or better comprehension than others reading at more conventional rates? There are no adequately documented references to support this statement. Smith's students were not compared with a control group. Adams had selected 12 super-normal readers out of the many he had worked with, and Dew and Wood did not provide any adequately documented results on which to draw such conclusions. The reference to Moore (8) was inappropriate, for Moore's subjects were attempting to skim, but were only able to maintain a mean rate of 200 words per minute. The highest reported rate in this study was only 533 words per minute. These references do not seem adequate support for Smith's claims.

Next, there is the suggestion that Smith's readers maintained superior comprehension at higher rates of travel than they would

have maintained reading in other ways and at other rates. This is not a valid conclusion since Smith presented only a single post-test situation with no comparison of the comprehension that might have been attained by his subjects had they attempted to read at rates below 1,200 words per minute. Any statement about the superiority of high rates of travel must be documented by a comparison of each individual's performances, both in efficiency and effectiveness, at *various rates* while attempting to read similar material for similar purposes.

3. Smith's suggestion that all reading is similar except for the variations in rate is completely unsupported by the research carried out by Grayum (6), Moore (8), McDonald (7), and Taylor (12). In these studies, which involved reading performances distinctly different from those usually encountered in accelerated reading, the subjects were found to employ distinctly different approaches or performances in carrying out tasks at reading rates above 800 words per minute, except for Moore's skimmers who averaged only 200 words per minute. The specific differences that were recorded, aside from the rates of reading, lay in the reduced number of fixations employed, the more random (less predictable) nature of the visual survey, and the increase in the duration of fixation over what was typical for the subjects in more conventional acts of reading.

What can eye-movement photography tell us about the differences among skimming, scanning, and accelerated reading? First, it can provide information as to the actual number of words "contacted" or seen by the reader and the manner or order in which certain portions of the page were observed by the reader. Through eye-movement photography used in these studies, it was possible to count the eye stops made.

The next factor to be considered is the amount of print that might be seen each time the eye stopped. Feinberg's (2) study deals with the physiological limits of acuity and, while it involved only eight subjects, presents the most valid information we have available today related to the fall-off of visual acuity from the point of fixation. The reduced acuity from the fixation point simply diminishes the probability of accurate identification or recognition and retention. Feinberg's data showed that two of the subjects could see nothing at all beyond four degrees, one nothing beyond three degrees, and that the other five were averaging only 29 per cent acuity at five degrees. Thus we see that three out of eight

subjects could see no words beyond four degrees, certainly an adequate percentage to lead us to question the acuity limitations of many readers.

Smith's statements about the use of context are certainly valid with print seen but with reduced acuity. However, his conjectures that a reader can make extensive use of peripheral vision are not supported by any form of research.

Perhaps the explanation for the spans of between 2 and 3 words for even superior readers lies in the findings of other studies, such as Gilbert's (4), which show that the accuracy of identification and recognition is most certainly reduced in the dynamic act of reading in which retinal images overlap as the eye shifts from fixation point to fixation point. This study would suggest that the less distinct peripheral impressions are less stable and are thus subject to greater loss when distorted by subsequent impressions. Further, Gilbert's study shows the marked decrease in recognition accuracy as a result of the kinesthesia and perhaps even by the survey pattern of the eye itself during reading. This study certainly provides more explanation of why limit of span in the dynamic act of reading must be regarded as salvageable span, or that amount of print or words retained by the reader and used by him in recalling and comprehending. All eye-movement studies involving enough subjects to be considered valid have shown that the average intake unit for the college student is only 1.1 word, and Spache (9) and others have cited 2.5 to 3 as being the maximum spans usually attainable, even with superior readers, after a reading improvement course. Certainly, these calculations were not of the physiological maximums of acuity, nor were they references to the thought processes of the individual, but were rather references to the salvageable span of recognition or reflections of the number of eye stops that were typically required of the reader in order to maintain adequate "contact" with the print. I have in the past and am presently using the term contact to refer to a condition in which there is adequacy of "input" for purposes of identification and recognition resulting from a proper or satisfactory balance of retinal stimulation, discrimination ability, and verbal expression on the part of the reader. It is almost certain that more words were initially seen at the instant of fixation than these figures reflect, but the quality of their retinal impression, combined with the short duration of time typical of the reading fixation, combined with the discrimination and processing limitations of the subjects who

were reading, served to produce peripheral impressions too tenuous to be utilized by the reader as he was involved in the dynamic act of reading.

When we take the fixations in studies involving skimming or high speed reading and multiply these fixation times by the maximum probable number of words that could have been seen and retained (salvageable span), we can quite logically estimate that in such studies as those conducted by Moore (8) and Grayson (6), the subjects could only have seen or "contacted" 25 per cent of the print. In the study by Taylor (11) reporting on a group of individuals who had been trained by the Evelyn Wood method, the subjects could have seen only some 10 per cent of the print; and that in the study by Thomas (14) cited by Smith, the subjects could have "contacted" only 8 per cent of the print. The small proportion of print that could have been seen at all raises serious doubt in the mind of this investigator as to whether or not readers covering print at rates above 800 words per minute have the potential for comprehension equal to that possible at less rapid rates of reading. These low percentages of print contacted raise basic questions as to the number of words necessary for what might be judged to be complete comprehension. I believe that the amount of redundancy in language is not sufficiently high to suppose that such limited contact would permit adequate comprehension of the entire message of the author. While not directly related, I would like to make reference to the studies of compressed speech in which 50 per cent compression or twice the normal aural delivery rate (at much slower rates than that cited in Mr. Smith's presentation) yielded significantly less comprehension than that maintained when more than 75 per cent of the words or word cues were presented to the listener.

There are several other statements that should be made with regard to Smith's references. There is, at this time, no adequate documentation for the fact that the Evelyn Wood method, presented by Evelyn Wood herself or by Dew, supports the claims that readers can be trained to read at rates of thousands of words per minute. In contrast to these studies, I would refer you to the paper previously presented by this investigator in the *Twelfth Annual Yearbook of the National Reading Conference*. In the study of the Evelyn Wood method, all the subjects maintained what might be termed "traditional" performances while reading the conventional Reading Eye cards and distinctly different performances

while attempting to read in the "dynamic" manner. Not only were the performances different, but the comprehension was significantly lessened by the subjects' attempt to read at rates of thousands of words per minute. Once again, I make reference to the need to compare an individual with himself.

I would like to question the validity of using Moore's doctoral thesis as a reference for reading rates of 1,200 words per minute or more, for Moore's subjects never read rapidly nor comprehended especially well. Further, the average comprehension of this group was only 59 per cent. As a point of interest, Moore's study, using the number of fixations Moore counted, suggests a span for his subjects of only 3 words. However, it is probable that Moore did not count all of the fixations, for his durations averaged to some .90 of a second, a duration that has never been typical of any reader at any age. It is more probable that many fixations were overlooked and not counted. If we used the more typical duration found by others in skimming and scanning studies, that of .25 of a second, the span of these people would be more probably 1.6 words. I would like to mention, too, that Moore also stated, "Skimming is a silent reading skill which is distinctly different from the slower, normal or rapid reading rates." It is evident that Moore, despite the probable inaccuracies in his study, did not himself believe different reading approaches to be similar except for variations in rate.

Next, the reference to Thomas (14) is inappropriate and inapplicable. Considering the small amount of material the subject could have seen, the fact that there was only one subject involved in the study, the fact that adequate comprehension was a judgment by a single investigator, one could not accept this report as support for Smith's rapid reading. I submit further a statement made by Thomas in a letter to me about his own results, and I quote, "I think the comments you make in your letter are completely correct and in my own mind I have little doubt that what I recorded was skimming and not reading. I feel that, like any data, some people will read into its whatever they wish to read."

The reference to square span, or to the possibility that a reader can use the print above and below the line of regard, would also seem to provide little support for a larger than usual visual intake by the reader. First, the efficiency of square span has never been adequately documented by eye-movement photography. Since this point was raised, this investigator prepared a special card in square

span and administered this to some half-dozen people prior to attending this meeting. The subjects also were given similar copy to be read in a conventional manner. All copy was taken from the Reading Eye cards, which have been found in previous studies to be quite reliable on successive retest situations. In all cases, subjects made significantly more fixations and regressions, and read at a slower rate on square span material than they did when reading with conventional copy. In other words, there is no basis for the suggestion that square span produces a more efficient reading activity. Regardless of this, square span should not have been cited by Smith to support any conjecture about the use of vertical span in reading on conventional lines of print, for in square span the words that followed each other in succession were grouped into small block of print, whereas conventional lines of print above and below the point of regard on the usual page do not immediately relate linguistically and meaningfully to the words being seen or dealt with on the line of regard.

In summary, in my estimation, Smith's paper provides no adequate support for his statement that equal or better comprehension can be maintained by most readers at rates above 1,200 words per minute, regardless of the reading improvement course they have been exposed to.

Not to acknowledge these differentiated performances of accelerated reading and skimming and scanning is not scientific considering the evidence presently available.

To question the Reading Eye validity and reliability is not justified on the basis of available research.

To offer opinions about span of recognition in light of what we know of the limitations of vision and the limitations imposed by the dynamic act of reading does not seem reasonable.

To offer comprehension scores on a single post-test without knowing whether or not the same individuals could comprehend more at lower rates is not adequate.

In conclusion, I might add that all persons involved with reading improvement are predisposed to search out and investigate better means of instruction, and I think we all share the same desire to improve reading ability in any manner possible, but there is a danger in suggesting, without adequate research, that extremely high rates of reading are possible for many. The dangers lie in the

fact that many students, inadequately prepared, will be exposed or pressured to accomplish these performances and will, as a consequence, suffer emotionally and perceptually.

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Twenty-Five Years of Research on Adult Reading

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One mark of a reading service's status may be its quantity of hardware and software. The number of accelerators, slide projectors, books and materials that are used is a most obvious sign of the director's success in the administrators' battleground. But equipment wears out or falls out of fashion. Materials get consumed and changed. The one thing that should remain and grow is the body of more or less systematic knowledge and techniques used by the staff to manipulate the equipment. It is because its collection of available information is really the fundamental asset of a reading service that one of our most prized possessions at the Reading and Study Skills Center in Minnesota is a set of three standard IBM file boxes. One of these contains 1027 edge punched IBM cards. On these cards we have citations and summaries of probably every study done in college and adult reading since 1896. The nucleus for the reading file was abstracted from a complete set of the Gray summaries. Ted Clymer had spent a great deal of time collecting all the journals in which they appeared. He was kind enough to loan them to Edward Summers, who sorted out the college and adult studies. The file has been augmented by approximately 800 studies of spelling. Mr. Garr Cranney added 1000 articles on study skills.

The reading studies have been classified into 22 categories, corresponding to 22 punched holes across the top. If a particular study contains information relevant to one of the categories, the appropriate hole is notched. By inserting a small metal needle through the deck of cards and lifting, it is possible to select immediately any of the studies that have been notched for any one of the 22 categories. For example, if I wished to find the studies on reader interest following World War II, I would select the deck of cards for the years 1945-59. I could then very quickly needle out the 46 studies of reader interest. If as I suggested above, the most valuable asset of a reading program is its file of available knowledge, then this indeed is a valuable asset.

The file is useful for purposes other than locating specific research. For example, it speeds up the job of a large scale literature

review. In fact, I am going to report some of the generalizations that I drew from just such a review made specifically for this conference—college and adult reading research from 1935 through 1959.

I want to make certain qualifications on the survey quite clear at the outset. First, the material on the cards leans very heavily on the published summaries—those by Gray, Bliesmer, and Harris. Many of the other studies were found through the *Psychological Abstracts*. I make no guarantee that we have completely covered the literature. But I think the research we have missed is a very small fraction of what is available. Second, the problem of publication lag produces an unknown bias in the results. Most professional journals have a publication lag of 18 months. Estimations of the time from inception of research to publication of a summary go as high as five years. That means that the research reported here could be as old as 1930 and probably no newer than 1957 or 1958. The third and greatest qualification, of course, is in the nature of the 22 research categories. It is entirely possible that another person would set up another set. However, with the number of categories as large as it is, I imagine that the overlap between people in the reading field would be quite great.

The left hand column of Figure 1 lists the 22 categories into which these studies have been sorted. Of course, any particular study may appear in more than one category. As a matter of fact, the average is slightly over two categories per study. That means that a study on reading rate may also contain some information on comprehension, and perhaps may also be categorized under programs and outcomes. The body of the table contains the percentage of studies in any category done in any one of the five year blocks. For example, row 1 contains the information on 243 studies reporting programs and outcomes. Twelve per cent of those studies were done in 1935-39, fourteen per cent in 1940-44, fourteen per cent in 1945-49, etc. If you wish, you may, of course, work backwards to get the actual number of studies, but I think the percentages will be more meaningful.

Lets now turn to some of the trends I noted in my survey of 729 studies in college and adult reading. These 729 studies produce 1622 category entries, a little over two ways to look at each study.

First of all, notice that the 22 categories have been arranged in a rank order of their occurrence over twenty-five years. The

Figure 1
Twenty-five Years of Research in College
and Adult Reading
Per cent of reading research in 22 categories occurring
in five year periods

Category	No. of Studies	Per Cent by Year				
		1935- 1939	1940- 1944	1945- 1949	1950- 1954	1955- 1959
1. Programs & Outcomes	243	12	14	14	29	31
2. Process & Factors	227	17	16	12	23	32
3. Method	173	15	16	9	27	32
4. Vision	123	17	19	11	27	26
5. Emotion, Personality, Attitude	98	9	11	19	34	27
6. Achievement	94	18	14	24	25	18
7. Tests	91	17	12	17	21	33
8. Diagnosis	76	26	14	10	28	21
9. Interests	75	25	13	12	35	15
10. Comprehension	69	13	19	8	17	42
11. Rate	60	15	10	10	18	46
12. Readability	57	7	12	10	42	28
13. Vocabulary	50	16	24	8	26	26
14. Physiology	46	24	10	17	26	22
15. Study Skills	34	18	14	14	18	36
16. Summaries	34	15	6	18	18	44
17. Sociology	32	22	13	19	31	16
18. Auditory	16	13	13	13	24	37
19. Phonics	11	9	18	9	64	0
20. Critical Reading	7	0	42	14	14	28
21. Case Studies	5	0	40	0	20	40
22. Skimming	1	0	0	0	0	100

modal category is that of "programs and outcomes" and half of those studies were done in the last ten years of the sample. I went through and counted the number of these studies in each five year interval that also report method and material used to achieve an outcome. I was looking for the proportion of studies that could be useful to a colleague setting up another program. I found that over the twenty-five year period the proportion of colleague studies

tend to go down. There was a concomitant increase in what I would call Dean Data. These are studies which merely report test-retest results of a program without detailing how this change was brought about. These studies appear to be designed to impress a dean or some other person responsible for budgetary decisions. There was another trend apparent in the program in the "programs and outcome studies." Over the course of twenty-five years there was a definite increase in the number of studies which dealt with other than college adults. The most frequent count, not too surprisingly, was executive and business reading improvement studies. I noticed that the colleague studies, reporting methods and innovations, were predominantly done in these non-college settings.

Studies of the reading process and factors involved (line 2) have increased markedly in the past ten years. However, there does not appear to be any new factor that has caught the fancy of experimenters. As I stated previously, each study fell, on the average, into two or more categories. For "process and factor" research, vision is the predominant second category and appears in about 30 to 50 per cent of the studies. "Emotions and personality" is also fairly common as one of the factors involved, but has not shown any particular change in frequency of mention over 25 years. It appears that no single area caught the fancy of a significant number of researchers. Physiological research in general, reported in line 14, appears to be a steady area of interest with no particular increase in percentage of studies, at least in this sample.

There are, however, rather marked changes in percentage of certain variables during the twenty-five year period. Let us turn to some of them. On line 17, reporting studies on the sociology of reading, we notice an increase in the percentage of such studies in the 1950-54 period. These studies tend to show the effect of external influences on our field. The primary increase was due to surveys of reading behavior patterns stimulated by the advent of television. These tend to be mass media studies or studies of particular social classes. We find here studies of the returning veteran or of minority groups. Incidentally, many of these surveys may be excellent data to demark the line of attack in the war on poverty. The interest seems to have dwindled and we note in the 1955 to 1959 area that studies in the sociology of reading return to their normal base rate. We notice in the same 1950-54 period that

emotion and personality research and reading interest research goes up. There's also the interesting increase in readability studies in this period. I can give no particular justification or explanation for that increase other than the fact that the name Miles Tinker seems to appear here with some frequency. I think we have a case of a research trend fostered by one highly productive individual who had a stimulating affect upon the work of many others. The other increase in this period in studies of emotion, interest, and sociology seem to me to be the response of the profession to the social changes that were taking place immediately following the war.

I was struck by the fact that the rate category ranked in about the middle of the distribution. I more or less expected that it would rank higher. When I looked at the 60 studies, I attempted to categorize them in terms of theoretical and applied studies. By applied studies I meant treatment studies designed to increase reading rate of the students. In the theoretical category I placed studies of the correlation between reading rate and other variables. These are primarily studies that have some implications for rate training, but did not report training per se. I was struck by the fact that the theoretical studies far outweigh the applied ones. The trend is particularly marked in the 1955-59 period where application studies are in the great minority. The latest theoretical studies tended to treat reading rate as a dynamic process under the control of variables like stress, adjustment, purpose, difficulty and so on. There were several methodologically adequate studies reporting experimental manipulation of reading speed. The earlier rate studies tended to be merely correlational and reflect an assumption that rate was a steady phenomenon. It's interesting I think to note that the one study of skimming that was reported during this quarter century appears concurrent with the interest in rate as a dynamic sort of construct. Since then, of course, there have been other studies of the skimming process. However, they appeared after the cut-off date of this survey.

Summary

This has been a rather brief presentation of the results of one kind of literature survey. The emphasis has not been on the content of research. (For this kind of survey, I deliberately refrained from citing specific studies.) It has been more on the sociology of reading research which is really the topic of this meeting. I have

attempted to trace some trends from a certain kind of analysis of data. That is the analysis of categories. The validity of this sort of analysis is very intimately tied to the way categories were set up and the reliability of an observer in placing various studies into these categories. This reliability, in and of itself, would make a very worthwhile study.

A larger issue, assuming the reliability and validity of these trends, is to specify the controlling determinants of the direction of research in reading. I have suggested that social events like World War II and the influx of returning veterans, and technological advances like television have had some discernible effect upon our field. It's an interesting question to speculate upon what other variables have affected the nature of our profession. For example, which of the observed trends is related to the availability of research grants? I suspect that the next twenty-five year survey will show increases in application studies stimulated by the attack on adult illiteracy.

Behavior Analysis: The New Look in Reading Research

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In attempting to produce meaningful generalizations about reading we are faced immediately with one of the most difficult and confusing problems attacked by man in his search for understanding of his universe. I refer to the problem of the nature of knowledge, truth, and meaning. My goal in this paper is to make some comments which might lead us to the point where we can begin a discussion of the present status of behavior theory, especially as it applies to the field of reading, and to discuss some recent developments in research methodology which seem to me to have great promise. I have not really decided whether our client, reading, needs remedial or developmental treatment. I couldn't even decide whether he should be studied using a genotypic or phenotypic approach. As you will soon see, I solved the latter problem by making a general approach to both the historical epistemological and the current-problem orientation. My plan is to lead to the inevitable truth by two roads.

Let's start with a consideration of the goal of science, psychological, or otherwise. It is to discover laws, generalizations, principles, and facts . . . in short, to discover the truth. At this point, the Philosopher raises the nasty question, "what do you mean by this word, 'truth'?" It would be very convenient to ignore him and go on with our data-collecting, but unfortunately as soon as we gather the fruits of our foray into the world of observation, we have to deal with him before we can say anything meaningful about our data, since we presumably gathered it in the first place in the hope that it would somehow lead us to something we will want to call the truth.

The truth can be called a number of things, and I propose to suggest briefly some of the various competing concepts of the nature of truth. On any Sunday morning you can hear truth described as that body of knowledge which is revealed or disclosed to man by divine will. This is a rather unsatisfactory concept of truth to most scientists because it becomes clear as soon as you turn the radio dial to another station, that the same truth

doesn't seem to have been revealed to all those who claim to have it.

Plato thought that truth was the body of knowledge which was tucked away somehow in the unconscious as a result of the experiences of the soul between incarnations while it was wandering about in the realm of absolute ideas. As he suggests when Socrates teaches Meno's slave a geometric theorem by simply asking him questions, truth is waiting there to be remembered. This concept of the nature of truth is very close to the notion of innate ideas, in which it is assumed that truth and knowledge is somehow congenital, and it has even been held by some that *all* truth is in the form of innate ideas, planted in the organism before birth.

The mystic will tell you, if you can't intuit it from him, that truth is the result of man's interaction with the one-ness of nature, and that by some mysterious process, he intuitively comprehends truths which are beyond human understanding. The scientist has the same problem with this brand of truth that he does with the revealed variety. Since truth is beyond human understanding and communication, except in special forms such as poetry, he can't even attack the problem of lack of similarity between individual versions of it. Besides, the scientist is understandably reluctant to have the effectiveness of his work (and the size of his salary) depend so much on the strength of his psychic factor.

It seems clear that a definition of truth, to be useful to the scientist, cannot be revealed, innate, or intuitive. This leaves us with the three most popular theories of truth, the correspondence theory, the coherence theory, and the verifiability theory. Since these have been extremely influential, and because they have some interesting implications for behavior theory, we will not dismiss them quite as airily as we did the others.

The correspondence theory of truth holds that truth is some form of correspondence between an idea and a fact or reality. According to this theory, a proposition or meaning has the quality of truth if there is a fact to which it corresponds, or to state it another way, if it expresses what is the case. This concept of truth is commonly held by people who are convinced that two conditions prevail. First, the subjective experiences of individuals are private property, so to speak, and cannot be communicated in any direct way. Second, there is an external universe out there which consists of things and events which can be known only by means of the senses. To illustrate this point of view, if I state the proposi-

tion, "There is organic life on Mars" my proposition has the quality of being true if in fact there is organic life on Mars. It doesn't make any difference whether anyone has seen it or whether the notion of life on Mars fits together logically with other propositions I might state. The criterion is the correspondence which somehow exists between my proposition and the fact to which it refers. The nature of the correspondence or relationship between the idea and the reality is a very difficult question, and is frequently not discussed in any detail by proponents of this theory. The difficulties in this position become clear if you consider the proposition, "There is a 50-ton battleship in my front yard." What, exactly, is the nature of the correspondence between my idea and the battleship? Is it somehow similar in size, weight, color, or shape? Unfortunately my idea is some sort of abstraction, and the battleship is a physical object. As Bertrand Russell (4, p. 84) points out, this difficulty in defining the relationship between idea and reality, combined with the feeling that, if truth consists in a correspondence of thought with something outside thought, thought can never know when truth has been attained, leads philosophers to seek a definition of truth which does not consist in a relationship to something completely outside thought or belief.

Such a definition proposes that truth consists in *coherence* among ideas. Propositions are true if they form a logically coherent system without contradiction. Unfortunately this definition of truth requires of the scientist that he accept a situation in which *more than one* coherent body of belief is possible, and that whole systems of propositions may be coherent, but in conflict with other systems. A case in point is the current situation in the theory of light. Wave theory and molecular theory are both coherent and each explains facts not explained by the other. Some physical scientists become very restless having to accept as true, two sets of conflicting hypotheses. One would hope that additional facts would enable scientists to reject all but one explanation for events, but we have no assurance that they will always succeed.

Russell has another objection to coherence theory, based on the fact that it presupposes the laws of logic. I will not summarize it here because it would take too long, and I don't think it contributes to our discussion of the position of the scientist in relation to truth seeking. Besides, I am eager to lead you on to the Real Truth, which is the theory most widely held by students of the philosophy of science.

The very nature of science requires that the function of the scientist is to gather data, speculate about it, create hypotheses concerning it, consider the implications of his attempts at theorizing, and finally, to verify his hunches. He considers truth to be what he is able to verify. He doesn't have to have read James' *Pragmatism* (2, p. 154) to take this approach, but when he does consider the philosophical underpinnings of his scientific behavior, he finds himself very much at home in the position put forth by James and later elaborated and enlarged by the Logical Positivists. The pragmatic (or positivistic) theory of truth is that truth consists in a working relationship between facts and men. An idea is true if it works and an idea is meaningful if it is verifiable. True propositions are those we can examine, corroborate, assimilate, and verify. False propositions are those we cannot verify. *Meaningless* propositions are those not subject to verification. Unfortunately, philosophy, psychology, and reading all share a common history of explanation by means of meaningless propositions. The philosophers and most learning psychologists have recognized this fact, and have changed as a result. Philosophy has become the study of logic and the science of science. Psychology has shown increasing concern with casting its language into operational definitions and verifiable propositions. It is time to do the same in reading.

We have been considering a number of possible answers to the question, "What is this truth that the scientist is seeking?" If you have followed me until now, you will know that my own belief is that the only defensible position is the one taken by those who hold to the notion that truth is a function of the utility of propositions in successfully explaining the data, and that meaning is a function of the verifiability of propositions. I have tried to describe briefly the various currently held notions of truth, and to show the inadequacy of all but the verifiability theory as a tool for the scientist to use.

All of the above discussion of the nature of truth is designed to convey my conviction that our primary concern, as we search for the "truth" about reading or any other aspect of behavior, should be for propositions which lend themselves to the statement of verifiable hypotheses. Otherwise we don't know what the "truth" means when we think we have found it.

One of the primary requirements for verifiable hypotheses is that they be stated in terms that are clear to all, and allow for no vagueness or differences in interpretation. I think that we often

lose sight of the fact that the goal of scientific inquiry in the psychology of reading is the prediction and control of behavior, and that the first step in such efforts to predict and control is the development of a scientific language which facilitates communication between scientists. The learning psychologist has found such a language by restricting his terms to those which are descriptive of observable events. I argue that to some extent, the lack of development of the science of reading is due to the inadequacies of our language. Partly because the behavior we study is largely covert, and partly because we have not given enough attention to our scientific language, we use terms that are best described as metaphysical. It is difficult, if not impossible, to formulate operational definitions for terms such as "improvement," "critical reading skills," "main ideas," or even "vocabulary." Specification of our exact meaning is the most important first step in increasing the explanatory power and the utility of our research.

However, clarity of terms is not the only requirement for useful and informative research. Some other criteria follow:

1. Research should be objective, in the sense that it gives the same information to all who do it or read about it. It should not be subject to the bias of the reporter.

2. Research should be repeatable and communicable. Results such as those obtained often in extrasensory perception studies, for example, are not repeatable or completely communicable, and are for that reason not useful to other scientists. Similarly, studies in reading which depend on the personal, private skills of a teacher in applying a method may not be sufficiently repeatable or communicable to be of help to anyone else.

3. Research must be generalizable to situations other than the particular set of conditions under which the data was gathered. Very objective well-described studies are sometimes of little use because the experimental conditions which apply in the data gathering are not characteristic of the universe at large. This is, of course, one of the common problems of doing laboratory research and attempting to generalize the results to behavior in its natural habitat.

4. Research is most useful when it offers data in new relationships which somehow bear on the problem of cause and effect relationships. It is not necessary, and in fact almost never possible, for studies to explain or to specify cause and effect relationships.

but it is possible in many cases for studies to be such that they enable us to predict and control events, thus serving the same purpose as cause and effect relationships.

5. It is usually helpful when research renders data which can be interpreted in terms of the notion of probability or strength of evidence. This notion of probability occurs in two different forms. In the first form it is a statement concerning the probability that the conclusions arrived at in the research are in fact true. In the second case it is a probability statement concerning the likelihood of a given event being associated with another event. The former should be related to the strength of conviction on the part of the researcher; the latter should be a general guide to the frequency with which predictions made from the data will in fact be borne out. This is an extremely important distinction, and is sometimes overlooked in discussions of the results of experimentation. It is one thing to say, for example, that there is unquestionably a relationship between two variables when one finds a moderate correlation between scores, but is quite another thing to say, without specification of frequency, that a high score on one measure can be used in a particular case to predict a high score on another measure.

6. To be maximally useful research should, of course, be applicable. By this I mean that it should not simply give us information concerning the relationship between variables and events but should provide us with a means to predict and control events. For example, many of the studies in the research literature in reading demonstrate that whatever was done in a rather poorly defined treatment seemed to have the effect of changing pre-test reading scores to higher post-test reading scores. However, this research is not applicable unless the treatment being utilized is specified to an extent that will enable the reader to discover what it was about the treatment which made the difference between the pre and post test reading scores.

Research Techniques in Reading

1. **Armchair or opinion.** Probably the oldest efforts to obtain information about the reading process are of this type. Unfortunately such efforts are not objective, repeatable, communicable, or relevant to cause and effect functions. They do not help us to predict events and tend not to be applicable in the sense

that they lead to changes in treatments from which changes in the effects can be predicted.

2. **Surveys of opinion or practice.** This kind of research, which is still rather popular in some circles, can be objective although it usually is not. It can be repeatable and communicable and can use probability or statistical concepts to aid in interpretation of the data. Unfortunately, it does not give us information about cause and effect relationships, and as a result is not applicable in the sense that it gives us new information about the effectiveness of techniques. However, it is sometimes extremely useful for non-scientific purposes. Information about the opinions or practices of others can be an extremely powerful political weapon when one is attempting to influence the behavior of academic administrators. It makes good "dean data."

3. **Normative Research.** This is a kind of research in which we attempt a description of the total population in terms of some particular variable. It is often very important for gathering the kind of data that is necessary for doing other types of research. For example, normative research is imperative if one is to engage in test construction or related activities. It is very objective, it is repeatable, generalizable, and often does give some notion of the probability of one event following another event. Unfortunately it usually sheds no light at all on cause and effect relationships, and is usually generalizable only to the population on which the normative research is carried out.

4. **Correlation research.** This is the most frequently engaged in type of reading research. The data used is usually objective data, repeatable observations are made, probability statements of both kinds are possible, and the results are generally applicable to those on whom the correlation studies were done. Unfortunately, correlation studies usually do not result in changes in technique or methodology.

5. **Treatment studies.** This kind of research is the sort very frequently reported in reading journals. Groups of students are given tests developed in earlier normative research. Some treatment is carried out and then the subjects are tested again. Insofar as one is interpreting the normative research on which the instrumentation is done the results are relatively objective, repeatable, and communicable; however, the central problem is the effect of an unspecified treatment. It usually offers little information that

is of real use in changing technique, and probability statements are restricted to the population on which the studies were done.

6. **Case Studies.** The efforts of some researchers to present evidence concerning the development of changes of behavior on the part of single subjects are usually not objective since they are subject to the bias of the reporter. They are also not repeatable. Probability statements generated by such research are usually not quantitative and offer relatively little help in the development of technology. They are generalizable only in the sense that other subjects may be similar to those described. They serve an illustrative, but not scientific function.

7. **Early behavior description research.** Some of the most valuable information we have about reading has come from studies which set out to discover exactly what was going on during the reading process. The eye movement research by Javal, Dodge, Dearborn, Buswell, Taylor, Tinker, and others was of this type. Also the studies of involuntary throat movements by various researchers was an effort to increase our knowledge of the specific behavior we call reading. In general these studies were *descriptive rather than manipulative*, and gave us some rather clear information about the nature of the ongoing reading process. They were very objective, repeatable, communicable, reasonably generalizable, and often included statements of probability in the second sense mentioned above. They did in fact enable use to predict events, but were often misinterpreted because some thought they were support for a technique to produce behavior, while in fact they were only descriptive of behavior.

Behavior Analysis in Reading

Behavior analysis is a term which has been used by learning psychologists in the last few years to describe research in which the ongoing behavior of an organism is studied and reported using only references to observable events. Stimulus situations are systematically varied using experimental rather than statistical controls and observations of behavior are continuous rather than taken at the beginning and the end of treatment processes. To apply the above criteria, this research is extremely objective and repeatable. It is communicable because it is not subject to the bias of the observer and deals only with events which are to be seen and easily described by all. More than any other type of research it enables us to predict events and gives clear statements

of the probability of events. It is generalizable to the extent that the behavior studied is similar in stimulus and response qualities to other events in which the researcher is interested. Its primary value is its applicability. The spectacular advances in the ability of psychologists to produce behavior have been due to the development of behavior analysis in the field of learning. I think the field of reading is ripe for similar advances.

Behavior analysis usually is done taking a point of view which emphasizes the analysis of behavior into stimulus, response, and reinforcement terms. It usually is done with single organisms studied continuously over relatively longer periods of time. It is an observation of the ongoing normal behavior of the organism and the changes in such ongoing behavior concurrent with the introduction of small specifiable changes in the stimulus situation. Analysis of data tends to be analysis of behavioral records, one subject at a time, usually using experimental rather than statistical approaches.

The difference between this general approach and that taken in more traditional reading research may become clear if we compare it with the research methodology used in a very excellent study of the effect of slanted text upon the readability of print by Miles Tinker (6, p. 287). In a very carefully controlled study Tinker administered tests to determine the effect on reading when the parts of a printed line are at different distances from the eye. Testing groups of students reading at different angles, he was able to demonstrate that materials slanted at a 45 degree angle were read 5.7% slower than flat copy and that print at a 60 degree angle was read 16.4% slower than flat copy. He did this research by measuring the reading rate of groups on the different materials. To do this taking a behavior analysis point of view, one would, first of all, not use a large group of subjects. One would put one subject in an experimental situation where his reading rate was continuously observable, and would manipulate the material so as to produce slanted type of various kinds in succession. The immediate response of the reader could then be observed. In other words, one would manipulate the experimental situation and watch the changes take place in the behavior of the organism under study. It would be possible to introduce all possible angles of type and in any order that the experimenter desired. It would be possible to observe the rate of change in reading rate as material of different slants are encountered. It would also be possible to find out

whether or not recovery from a slow rate of slanted material was immediate or gradual when the type became vertical again. It would be possible to get some information concerning techniques for teaching people to read slanted type, if that were desired. There would be no difficulties with statistical controls involving non-equivalence of groups because there would be no groups. One could probably gather all the necessary data in one hour of subject time, and could replicate the whole study on another subject in one more hour of experimental time. Probably one would not need to use more than three or four subjects if the resultant response curves were identical on the first three or four. This is an example of the power and the economy of using behavioral analysis combined with the experimental manipulation rather than statistical, randomized controls.

Other excellent examples of behavioral analysis in the field of experimental psychology are the studies of reinforcement schedules in humans and animals. It was in these studies that we discovered the effectiveness of certain reinforcement schedules in the development and maintenance of behavior. It is interesting to note that many of the results obtained would simply not have been found had the researchers involved been using statistical controls rather than experimental controls. For example, the peculiar shape of the curves representing rate of response under fixed ratio reinforcement probably would not have been discovered using any commonly used statistical technique. The only way to see those relationships was to gather the data on an accumulative curve and look at the shape of the curve. The studies of reinforcement schedules and their power in changing behavior led to a very rapid advance in the capability of psychologists in changing the behavior of animals. Combined with the notion of shaping, which was also developed using a similar research point of view, it became possible for psychologists to do such well known tricks as teaching pigeons to play ping-pong. The notion of reinforcement and shaping led rather directly into the development of programmed instruction techniques, and have not become so powerful and ubiquitous in the current literature in the field of learning theory that textbooks written as little as seven or eight years ago are almost completely obsolete. Reinforcement has become the dominant mode of explanation for human behavior.

The rapid changes in the nature of psychological theory seems to me to offer hope that similar developments may take place in

the field of reading. There is already some evidences that this is happening. We have, for example, the research of O. K. Moore (3, p. 58), A. W. Staats (5, p. 33) and Wells Hively (1, p. 279), demonstrating the acquisition of reading behavior on the part of very young children. At Minnesota we have been attempting to do behavioral analysis in reading at the adult level. In one study we found that the presentation of material to be read was a powerful reinforcer for the behavior of continuing on a reading task, and demonstrated that characteristic response records would be generated by young adults using reading material as a reinforcer on a fixed ratio schedule and a variable ratio schedule. We found the characteristic behavior curves for each of these schedules and the expected differences in each of the extinction curves. Apparently Minnesota students respond like Skinner's rats, pigeons, Harvard sophomores and other lower organisms. It is a very interesting and somewhat unnerving experience to see a college student who complains that he is a poor reader sitting in front of a teaching machine with a blank window, pulling a lever over one hundred and fifty times trying to get another piece of reading material to appear in the window of the machine. One can scarcely believe that that much control over what we have called motivation to read could be achieved in less than one hour of training time.

In another study we have found that it is possible to produce marked changes in rate of responses in reading by providing secondary reinforcement in the form of a signal light to students, differentially reinforcing them for changes in reading rate. We first found that it was possible in most cases to approximately triple rate within one fifty minute training period. We later found that it was possible to shape students to the point where they would increase flexibility in the reading rate they applied, as they were conditioned to speed up and slow down, again using a secondary reinforcer. We are now doing research in study behavior and making rather systematic observations of the ongoing study behavior of one college student in particular. We have been observing his study, carefully recording several aspects of his response behavior over a period of more than two months now. We have been doing relatively little in the way of manipulating his stimulus situation, but we have done some things designed to change the rate of response in his reading of his study materials. We have been giving him feedback by means of lights and buzzers on various reinforcement and avoidance schedules, gathering rate of

response, comprehension, and retention data. We are also, incidentally, getting a continuous behavioral index to the readability of his textbook. We can look at the effect of graphs, charts, and pictures on his reading rate. This is an attempt to go into the real world and examine the actual study behavior of a student in a practical situation. It is an attempt to produce findings which will be maximally generalizable and applicable as we attempt to do the most practical possible things. We want to know how he is studying and how we can influence it.

From the research we have already done we can make some generalizations that may be of use. It seems fairly clear from our studies, and those of others, that if one wishes to produce initial learning, that one should provide whatever reinforcement is available for the desired response on a continuous reinforcement basis. That is, whenever the desired behavior occurs, it should be immediately reinforced every time. If on the other hand, the behavior repertoire has already been developed, one should put the subject on an aperiodic or partial reinforcement schedule, thus maintaining a high level of responses over a long period of time with great resistance to extinction. One suggestion that grows out of this research is that students for whom rate improvement is appropriate should be given immediate reinforcement whenever their rate does, in fact, increase. This suggests shorter exercises with immediate scoring and immediate rate computation, with results fed back to the student as quickly as possible. The more instances of rate improvement the student experiences, the higher the probability that his rate will continue to increase. These same generalizations about reinforcement are applicable in the area of comprehension skills and vocabulary development as well.

On the basis of the research we have already done using behavior analysis approach, we can say that it has enabled us to do research we could not have done otherwise which suggest specific changes in teaching technology. We suspect that it will be as helpful in the reading field as it has been in the psychology of learning. In any event, watching behavior develop as we manufacture it has been a lot of fun, and we hope to keep our factory running. The help wanted sign is always out.

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1964 Review of Research in College-Adult Reading

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Reports covered in this review of research relative to the college-adult reading area are mainly ones which have appeared in the literature during the year previous to September, 1964. Several earlier reports which were missed in the last several reviews or were not available earlier have also been included. The various reports of studies deemed pertinent for purposes of this review have again been treated under headings similar to those used in previous years. Since the last review (3), a summary report of selected research articles relative to college and adult reading (7) and an extension of this report (8) have been prepared and presented by Cranney. Summers (67) has also again presented his annotated list of reports or abstracts appearing in *Dissertation Abstracts* which dealt with reading. A number of these were relevant for the area of college-adult reading. Nearly all of the pertinent references cited by Cranney and by Summers have appeared in the annual reviews here in previous years.

The attention of this conference was called, last year, to a noticeable decrease in the number of reports considered relevant for this review, with this decrease being attributed, in part, to the fact that the Twelfth Yearbook of this Conference had not yet appeared at the time this review was being prepared. (The Yearbook of this Conference has been an appreciable source of reports for this review in the last several years.) The attention of this year's Conference must be called to the noticeable increase in the number of reports. Both the Twelfth and the Thirteenth Yearbooks of this Conference (65; 72) were available at the time this year's review was being prepared; and the number of bibliographical items for the review is approximately double that for the 1963 review.

Reading Programs (Reports, Surveys, Evaluations, Methods)

A considerable number of reports involved more or less detailed descriptions of programs. (E.g., 6; 9; 10; 16; 17; 18; 22; 33; 34; 44; 45; 53; 55; 63; 68; 70; 75; 77) A number of the reports in

one particular yearbook (59) appeared to have as one of their primary purposes presentation of details of specific college and industrial reading programs. However, presenting a detailed description of a program was usually not the main intent of articles.

Some type of consideration was given by a number of investigators to evaluation of results or effectiveness of particular reading programs. (E.g., 4; 6; 9; 10; 12; 16; 17; 18; 22; 33; 36; 37; 44; 45; 51; 53; 55; 56; 58; 61; 64; 68; 70; 75; 76) Some type of standardized reading test was used, at least in part, for measuring gains or effectiveness in a majority of reported programs; but various non-standardized tests were also used in some. Statistical analyses of results were not employed in a majority of the reported studies (or at least the use of such was not clearly indicated in a majority of the reports); but definite statistical treatment of various results obtained was indicated for a number of programs (e.g., 6; 22; 37; 38; 44; 45; 47; 53; 56; 58; 61; 75; 76). Definite indication of use of control groups in statistical analyses employed was indicated for only a few programs (e.g., 73; 76). In studies in which gains in reading skill areas were definitely given statistical tests or treatment, gains in reading speed or rate but not in comprehension were reported for a number of programs (22; 37; 38; 44; 55); gains in both rate and comprehension (and/or vocabulary) were indicated for only a very few programs (e.g., 45; 58). In a number of other studies, statistical tests were not applied (or such applications were not indicated); but there were indications of gains in more than just rate in some (4; 12; 16; 18; 64; 70; 73); and in several other reports there were indications of rate gains only (9; 17; 22; 51; 68).

Improvement in grades or course progress was among the criteria involved for determining effectiveness of some programs. Ketcham (33) found that whereas 35% of the students in a reading and study program in 1959 had multiple failures in course work, as compared with 20% for the class of 1959 as a whole, only 14% of the 1960 reading class had multiple failures, in the same proportion as did the class of 1960 as a whole. Parker (51) found change in grade point averages to be correlated negatively with rate changes and only slightly positively with comprehension changes. However, correlations obtained lacked statistical significance.

Retention or permanence of gains was studied in two reports (51; 58). Ray (58) found the significant test score gains attained by

two groups of college reading improvement class students to have been retained after three months and after six months. Parker (51) found changes in rate and comprehension for his sample of college reading program participants to be negligible.

Ketcham (34) and Wright and Lazaraton (77) were concerned, in part, with dropouts in reading programs. Ketcham (34) described changes made in Lafayette College's reading and study program in recent years and reported that dropouts in the program had decreased from about 20% in 1957 to 1 in 250 in 1962. Wright and Lazaraton (77), comparing a group of completing freshmen with a group of nineteen students who had dropped during a reading course, found significant differences favoring the completing group with respect to feelings of "personal control"; but no differences between the completing and attrition groups were found with respect to other measures of ability and achievement obtained.

Several survey studies were reported. Ketcham (34), in her questionnaire study of dropout problems in non-credit reading courses, found dropouts ranging from 0% to 80% in the 54 out of 90 colleges reporting, with approximately one-third having less than 5% dropouts, one-fifth having 5% to 15% dropouts, one-sixth having 16% to 25% dropouts, and approximately one-fourth having over 25% dropouts. Comparison of data with those obtained in a 1955 study indicated that the dropout problem is greater today than it was earlier. Patterson (52) conducted a third questionnaire survey of present use of reading improvement programs in large industrial companies and compared findings with those obtained in his 1958 and 1956 surveys. Among his findings were such as the following: slight increase in the number of companies having reading improvement programs, twice the number of reading improvement programs between 1958 and 1962 as between 1956 and 1958, a continuing preference for voluntary types of programs, and a preference on the part of companies to use their own training department personnel. Group training was preferred by two-thirds of the 103 respondents; most programs vary from ten to forty hours in length; and equipment or materials used remain fairly stable (with the Perceptoscope being the only piece of equipment which gained in usage). Entwisle and Entwisle (4) were concerned with studies relating reading program progress with gains in grade-point average. An earlier report of Lowe's survey of reading improvement programs in Virginia colleges and universities (43) was referred to in last year's review (3).

Pre-college programs were involved in some reports. Maxwell (44) found that of 360 students registered for a pre-college reading and study skills summer program thirty-six officially withdrew, 176 obtained grades enabling them to continue at the university, and 144 failed. Attendance (which was optional) of successful students was significantly higher in mean hours than that of the failed group; successful males attended more meetings than did failing males but the reverse was true for females. McConihe, Prien, and Svetlik (45) evaluated the effectiveness of a preparation-for-college summer program on the reading and writing skills of 117 participants. They found measures of reading showing considerable improvement in each of the areas tested by the *Cooperative Reading Test*, C2. They did not find significant improvement in written expression skill (writing of themes). Shanberg (64) presented a summary of mean test scores gains obtained in Western Reserve University's summer Preparation For College programs for 1959 through 1962.

Several reports, in addition to Patterson's study (52), were concerned mainly with programs in industry (9; 10; 22; 68). Cross (9) reported positive results for a number of participants in three reading improvement programs conducted for the Firestone Tire and Rubber Company. Crowell, Gerjuoy, and Wendt (10) reported "striking differences" between earlier and later performance levels of participants in three University of Toledo reading training programs (mostly adults from business and industry); but they reported that regular types of comparisons were invalidated by contamination of tests or test data. Hastings (22) found members of an executive group who read films at the faster of two speeds made significant rate gains while maintaining comprehension. Gains of the group who read films at slower speeds were less marked but still noticeable, with maintenance of comprehension also. "Short reading tests" were used to evaluate rate and comprehension gains in an executive reading training program and in-company training programs at Western Reserve University reported by Svetlik (68). Results of the program had not received statistical treatment; but data presented by Svetlik seemed to indicate definite progress, in general, in the area of reading speed, while comprehension changes seemed negligible.

Adams (1) presented a rationale for an operational definition of "supernormal" reading ability, reading "at or above 1500 words per minute with comprehension at or above 70%" on Form A or B of the *Diagnostic Reading Test, Survey Section* (1, p. 138). He

presented data for twelve selected students, with reading training program posttest rate scores ranging from 1597 to 5112 for eleven subjects (with 17,140 for one subject). Adams suggested that while guarantees that training will make supernormal readers cannot be made, hope could fairly be held out to students that involvement in a reading program might liberate latent capability of students. Thalberg and Eller (70) compared results obtained with an experimental group of college students and other adults using "dynamic reading" methods and procedures, of the type taught by Mrs. Evelyn Wood at the University of Delaware, with results obtained by a control group receiving typical reading program instruction. Various results obtained with instruments used indicated, in general, that the "dynamic reading" technique would produce faster readers than the more conventional or typical approach (but various rate scores obtained were not over 1,000 words per minute); but the control group seemed to have somewhat better comprehension, but not always significantly better. There reportedly were indications that some of the experimental group readers gained at the expense of precision, appearing to have been skimming rather than actually reading.

A number of investigators or reporters were concerned with analyses or comparisons of methods in reading improvement programs. Kingston (35) sampled the reactions of fifty participants in a television reading improvement course, consisting of twelve half hour programs. He found only nine, or 18%, of respondents had witnessed two or more telecasts. Twenty-four, or 48%, had seen only half or fewer programs. Only 6% indicated that they had practiced daily, and 16% indicated that they had practiced two or more times per week. Estimates or opinions concerning degree to which reading rate and comprehension had improved varied widely, with over one-third and approximately half failing to respond to estimates of rate and comprehension gains, respectively. Raygor and Summers (61) found that, when statistical controls of pretest differences were employed, no significant advantages were shown for experimental programed materials used by an experimental group of college students as compared with results obtained by a group using *SRA Reading Laboratory* material. (The experimental programs ran for only three instructional hours.) Similar results were reported by Raygor in another study (60). Rankin (55; 56) had one group stress speed for the first seven weeks of a college developmental reading course and comprehension in the last seven weeks. A second group alternated the sequence. The group re-

ceiving speed emphasis first, was found to be reading significantly faster than the second group at both midpoint and at the end of the course; but vocabulary and comprehension gains were not significantly different at either time. The students in the group stressing rate first also gave more favorable questionnaire reactions. Rankin concluded that, in working with poor readers at college level, stress on speed might have profitable results even before comprehension has improved substantially. Laffitte (37; 38) (also cited in last year's review) studied three groups of college freshmen, one group receiving two months of skimming practice exclusively, the second group receiving only rapid reading drill, and the third group receiving both skimming and rapid reading practice. He found all three groups increasing significantly in reading speed, but with average gains not being significantly different. All three groups failed to gain significantly in comprehension, and mean gains of groups were not significantly different. Laffitte concluded that various techniques in reading improvement programs may lead to similar results with regard to gains in reading speed but may not yield comparable comprehension increases.

Supplementing the regular reading activities in the reading improvement course with auding instruction, in the study by Lewis (40), was not found to produce significantly greater improvement over that of a group that had received only reading instruction, in either reading or listening performance. Mitchell (47) found highly significant changes in reading achievement between a control group of nursing education students and experimental groups of nursing education students who had received either non-verbal visual training, motivational training, or both non-verbal visual and motivational training. (No actual reading improvement programs were involved.) No differences were found to occur among the experimental groups, in terms of reading achievement and gains.

Brown (41) presented various types of data (somewhat generally) to show improvement of test scores in various skill areas. He found that students using workbook-type aids made somewhat better gains in vocabulary skill than did those using a regular text, groups using more structured assignments (a text with an assignment sheet) making over twice the percentile rank improvement of other sections not using structured material, and participants who supplemented televised class instruction with approximately three practice readings a week for twelve weeks making up to five times the rate increase of those doing fewer than one a

week and six times as much gain in comprehension. He also found, in general, that close structuring of outside assignments in various vocabulary and reading improvement courses appeared to be a particularly important factor in achievement of gains in vocabulary, rate, and comprehension.

Influences of Reading and Study Skills and Habits

Several reported studies had pertinence for indications of influences of reading and study skills other than influences in bringing about gains in a reading improvement program. Drew (11) found reading scores (*Diagnostic Reading Test*) to have significant relationship with the school grades of machinists' apprentices. "Total comprehension" and "effective reading rate" scores were found to be among the best predictors of school achievement. "Effective reading rate" was also found to be among the most promising predictors for job performance ratings.

In a prediction study reported by Hood (26), reading comprehension (SCAT) was found to rank relatively low as a predictor for pre-dental college grade-point average (correlation of .22) but was found to be the best predictor for dental college grade-point average (correlation of .79). In a study of academic prediction conducted by Long (42), verbal ability seemed more important for women whereas quantitative ability or aptitude served as a better predictor of grades for men. Long attributed the attained sex differences to levels and types of motivation experience, level of maturity attained, and types of courses typically chosen by women. He felt that personality factors seemed more important for men and interest factors more important for women, with this possibly resulting from greater immaturity of men and better motivation for women entering college. Fortna (15) obtained results, in his factor analytic study of tests (SCAT and STEP), which indicated that the STEP mathematics test measures more than reading comprehension, although reading and verbal skills were still involved to some extent. He concluded also that reading ability commensurate with the testee's grade level was necessary for adequate understanding and performance on the test.

Scheyer (63) found a negative correlation between verbal aptitude scores (*Scholastic Aptitude Test*) and reading posttest scores. He suggested that there were indications that an extensive developmental reading program might yield an increase in verbal

aptitude scores on the part of participants who are initially low in verbal aptitude. Students in the experimental reading training program reported by Wright (76), and who made significant gains in reading test scores, did not exceed a control group significantly in grades in quantitative courses (science and mathematics); but the experimental group had significantly higher grade-point averages in verbal courses (social sciences and literature). Wright felt that the results indicated that reading training can promote academic success. Ray (58) found that both groups of low initial reading performance and of high initial reading performance benefitted (made significant gains) from a reading improvement program. McConihe, Prien, and Svetlik (45) did not find significant improvement in written expressions skill (writing of themes) on the part of participants in a preparation-for-college summer program of reading and writing skill improvement. Wright and Lazaraton (77) found no differences between completing and attrition groups in a reading course with respect to initial reading test scores.

Factors Influencing Reading and Study Habits and Skills

Concern, directly or indirectly, in a number of reported studies was with influences of various conditions or factors upon different aspects of reading performance and behavior. Hayden (23) compared rate and comprehension scores of athletes obtained before and after training and other physical activities with scores of control groups. Results obtained led her to conclude that fatigue had little or no effect on comprehension and rate scores. It was also found that reading rate scores were significantly greater in the evening than in the morning; but she found no significant differences in comprehension at different times a day. In an effort to study the reading flexibility of able readers of advanced academic status, Hill (25) had them read each of three selections under different pre-reading directions or purposes. He found differences in mean performance on rate, total comprehension, and three specific comprehension areas (main ideas, stated details, and critical analysis) under the three pre-reading directions to be very slight and insignificant. Relatively low rate performance under all three conditions was found, with "rather minimal" accuracy of comprehension.

Weaver (74) modified expository paragraphs in publishers' tests of different levels (including college) so that bilateral context (five context words preceding and five following a blank to be

filled in) or unilateral context (a blank to be filled in after ten context words) conditions were obtained. He found that a group of college upperclassmen were significantly better able to predict words in the bilateral context than in the unilateral context, indicating a greater restrictiveness of context when a word is embedded within it.

The visual duration threshold of a group of lower division psychology students was found to be significantly lower for words of high "meaningfulness" than for words of low "meaningfulness" by Johnson and Zara (29). Their results also suggested that the influence of meaningfulness varies with the Lorge-Thorndike frequency of the words and that a sex difference does exist with regard to influence of meaningfulness on visual thresholds at different frequency levels. Harcum and Dyer (21) in a study of reproduction of stimuli appearing in the right or left half of the visual field (with targets being exposed tachistoscopically) concluded that adult subjects had learned to favor elements in the left visual field and that possible effects of eye and hemispheric dominance might have been hidden or clouded by this learned or established left superiority.

Kershner (32) obtained reading speeds of a general adult sample without members of the group being aware that their reading was being timed. Subjects each read four passages under varying conditions with each of various passages used in the study being in each position an equal number of times. It was found that easier passages were read faster than the more difficult passages, that the reading time required for reading passages under situations of differential stress (knowing that comprehension questions would be asked) was greater than when the same passages were read without subjects being under particular stress or purpose, and that passages read under conditions of relative lack of stress were read faster than those read under differential stress conditions, even though passages under both conditions were of varying levels of difficulty. The investigator suggested that speed of reading is of questionable significance if knowledge of difficulty of materials is not obtained.

Laffitte (37; 38) found no significant gains in reading rate of his subjects during the second month of his study, although there had been significant gains during the first month. In addition to the possibility that subjects had begun to reach their improvement

limits in the first month, reasons for lack of gain were also attributed to decrease of interest as novelty of methods and materials decreased and increasing difficulty of materials.

In a study reported by Lewis (39), the group of freshmen who received a study program over assigned political science material performed significantly better on a criterion test than did a control group who received a lecture over the material and was told to read the course text. However, a control group which was told only to read the assigned material did not perform significantly differently from the experimental group. The insufficiency of the lecture method was reported to be most evident for upperclassmen with a low ability. Murphy (49) studied the effect of having no summary and having a summary at the beginning, the end, or at both beginning and end of selection, on recall. He concluded that having a summary at any location was an aid to learning (both immediate and delayed recall); but he found the most effective aid to be a summary either preceding or both preceding and following reading material.

Taylor (69), in a series of investigations concerning factors influencing efficiency of listening performance, found that academic attainment (some college training) characterized the better listeners on tests involving discrimination of listening capability. College groups were also found to do significantly better than no-college groups on tests of auditory memory of digits, were better able to adjust to variations in rate of presentation, and were also found to score significantly higher on tests of word meaning in context and of awareness of idea sequence. When Thalberg (61) compared the test performance of a group which had read two tests of different levels of difficulty with the scores of a group which had listened to the same tests (magnetic tape recordings), he found listening to be inferior to reading as a mode of sensory input. When comparisons were made within groups according to ability (*American College Tests*), it was found that the different modes did not differentially affect the various ability levels of students and that neither the ability level of subjects nor the difficulty level of material differentially affected the relative effectiveness of the modes of presentation.

Rankin (56; 57), selecting "extreme introverts" and "extreme extroverts" (*Gilford-Zimmerman Temperament Survey*) from a college freshman class list, found the mean total reading score (*Co-operative English Test*) for introverts to be significantly higher

than for extroverts, with indications that superior test performance was effected by a combination of both reading and test-taking skill. The relationship between reading test results and grade-point average was not significant for extroverts; but it was found to be significant for introverts. Hafner (19) also found introversion to be a differentiating factor in grades achieved.

Ennis (13) concluded, on the basis of a review of the skimpy amount of sociological research on reading, that education still continues to be the most important determinant in the adult use of books. The effect of educational level on test performance in various listening discrimination situations was also noted by Taylor (69). Level of education was also found to play a role in the reading done by blind subjects in Heger's study (63).

Axford and Richardson (2) reported on the basis of their experiences and observations with reading improvement programs for adults, that there were "indications that some of the main causes" of reading deficiencies included "defective vision, hearing loss, and poor motor coordination" (2, p. 55). They further reported that some of the "the most frequently observed sources for reading deficiencies include a lack of varied reading experiences, a lack of continuity through the school experience, a lack of early diagnosis of difficulties, a poor cultural background and environment, technical training which has required a slower rate of reading over a long period of time, and physiological factors such as defective hearing, impaired speech, glandular deficiencies, environmental conditions, and emotional factors." (2, p. 55)

Reading, Study, and Other Habits, Traits, and Skills

A number of reported studies were concerned, directly or indirectly, with various types of characteristics of poor, able, and other types of readers. (19; 25; 31; 34; 40; 44; 48; 54; 62; 63; 66; 77) Hafner (19) found that poor readers in his group of senior level college students, when compared with abler readers in the group, were less rapid "cloze task" workers, were less able in using contextual clues to meaning, less intelligent and knowledgeable, and poorer in reasoning ability. In a study conducted by Burns (7), results obtained indicated that successful students (high scores on reading tests) have inadequate concepts of the reading process and its potential for learning, have poor reading habits, and avoid reading as much as possible.

The successful students in the pre-college reading programs study reported by Maxwell (44) made significantly higher initial scores on reading rate, vocabulary, and comprehension (*Nelson-Denny Reading Test*) than did the failing group. They also had a higher average attendance record. Questionnaire data obtained from Maxwell's pre-college summer session students revealed that lack of time was given as the most frequent reason for not attending sessions, with about half of the dropout group giving this as a reason. Over a third of the dropouts in Ketcham's study (34) gave not enough time as the reason for dropping reading courses, while less than one-sixth gave lack of progress as a reason. Over one-third of the instructors, however, estimated that dissatisfaction with progress and failure to find a "miracle cure" were the real reasons for dropouts, while over one-fourth of the instructors ascribed dropouts to poor motivation. Less than one-sixth of the instructors felt that lack of time was a real reason. Purcell (54) asked college students and other adults to rank the three or more bad reading habits, of twelve presented in a list, which applied to them. The first six indicated, in order of importance, were as follows: word-by-word reading, vocalizing, backtracking, day-dreaming, plodding, and rereading.

Schneyer (62; 63) found none of various aptitude, reading, and study habits and attitudes test scores obtained from college students in a reading course to be discriminatory with respect to students who made considerable, average, and little progress, that is, no measures discriminated sufficiently for prediction of individual progress. However, group differences indicated that members of the higher improvement group tended to have low verbal aptitude scores, have made tentative occupational choices by the time of college entrance, and be readers of serious books.

Stevens and Orem (66) reported observing a pattern of behavior for fast readers, this pattern being based on observations made of about two-hundred who could read various materials faster than 1500 words per minute and with good comprehension. Among characteristics noted as being possessed by rapid readers were the following: high initial rate (entering the course reading over 300 words per minute with good comprehension); above average in academic achievement and having reading as a major form of recreation; good visual memory, with a dependence on such, and a preference, in general, for visual presentation of material over aural presentation; relative independence from sub-

vocalization and inner speech; reading parts of several lines at the same time, without a need for observing the sequential pattern of speech; a lag between perception (with eyes) and cognition (with brain); eccentric or unorthodox eye movement patterns.

The influence or accompaniment of emotional or personality factors was considered in several studies. Joseph and McDonald (31) found high level reading achievers generally scoring higher in needs "to achieve" and "for change and affiliation" (*Edwards Personal Preference Schedule*). Students scoring low on reading comprehension and rate appeared to possess greater aggression, order, and abasement needs. Findings obtained by Liberty, Pierson, and Burton (41) in their study of cognitive and non-cognitive aspects of reading ability suggested that poor readers were likely to be pessimistic, anxious, low in achievement evaluation, intolerant of ambiguity, and high on succorance and abasement needs.

Wright and Lazaraton (77), comparing a freshman group completing a reading course with a group who had dropped during the course, found significant differences favoring the completing group with respect to feelings of personal control; but the completing group exhibited less confidence in self-powers of dealing with various outcomes. As was pointed out in an earlier section, no differences were found between groups with respect to other measures of ability and achievement, including reading test scores. Schneyer (62; 63) found dropouts in a college reading course to be the most anxious and the least motivated.

Studies by Hill (25) and Moe (48) involved consideration of flexibility in reading rate. Hill found advanced and able readers revealing a lack of flexibility with reading rate and comprehension under various pre-reading conditions and purposes, with low level comprehension accuracy being obtained on the first reading of selections. Moe (48) found college students reading third-grade materials at approximately the same rate as college level materials, with flexibility increasing only slightly after training. He found an increase in estimated mean "high differential" (measured difference between silent and oral rates in college level materials); but he concluded that colleges graduate great numbers of slow, inflexible readers.

Several investigations of reading habits of adults have also been reportedly recently. Ennis (13) has pointed out that hardly any sociological research studies on adult reading are being done;

and he deplored the paucity of such research. He reported that the expenditure for books in this country has increased by 76% from 1950 to 1960 (for all types of books); but the fact that the growth rate of the educated portion of the population (high school or college graduation) has been much lower during that time, about 35%, makes it difficult to understand or account for the increase in sale in books. He cites findings in studies by Hajda (20) and Johnstone (30) as further cause for puzzlement. Hajda's findings in his study of visits of the adult population to the Enoch Pratt Library (20) were that less than one-fourth of the adult population visited the library during a year and that only approximately half the population had read at least one book during a year. Johnstone (30) found only slightly more people, in his study of adult education, who were book readers, about 60%. Odland and Ilstrup (56) asked approximately 350 college students in children's literature courses to list all books read during the previous six months and the magazines read regularly. Analyses of responses thusly obtained, with regard to reading patterns and volume of reading, led the investigators to conclude that the students surveyed were similar in personal reading and volume of reading patterns to reported patterns for college students in other studies. Similar results were obtained from repeated surveys in which the same questionnaire survey was used.

Menzel's review of the field of information needs with respect to current scientific research (46) indicates that the skills needed in searching the literature for an area, or even in knowing where to locate or find what is needed, are much beyond the skills required in simply "getting through a single book" (46, p. 581). Heger (24) tried to ascertain the long term usefulness of Braille as compared to that of the talking book, with a selected sample of blind adult subjects. Braille was found to be more popular for writing than for reading. The majority of subjects preferred the talking book and other auditory media for reading. Subjects were found to be more handicapped in rate than in reading ability level, with the mean ninth-grade level of reading ability being relatively comparable to that of the sighted adult but the mean rate of thirty-three words per minute (*Gray Oral Reading Paragraphs*) being much slower than the rate for the average sighted reader.

Drew (11) found that the reading performance of a group of machinists' apprentices were equal to or better than that of high

school seniors or college freshmen. Although students' gains made in a program reported by Durand (12) seemed to be appreciable, the efficient reading course for practical nursing students was given a "good" rating rather than an "excellent" rating because of the "teacher's expressed disappointment that, having made an improvement in their reading efficiency, the students of her first class aren't yet making much leisure time use of the school library as they might. The teacher maintained that to read well is to enjoy reading; and to enjoy reading is to read voluntarily whenever there is time." (12, p. 135)

Miscellaneous (Tests and Testing, Readability, and Other)

Several reported studies were concerned, to varying extents, with influence on or factors affecting test results or test effectiveness. Clark (6) found no significant differences in reading speed and comprehension when groups had beginning testing instructions reinforced during the reading of test selections. Rankin (57) concluded that reading test validity (for the *Cooperative English Test, Reading Comprehension*) was sufficiently low for extroverts to limit values of tests when used with such types and that reading test validity was greater for introverts than for either normal or extroverted types. Taylor (69) has described a number of experimental attempts to measure various aspects of listening performance (auditory memory, ability to interpret word meaning in context, ability to index orally presented material, and awareness of ideas). Among other things, Taylor found letters to be a better measure of immediate auditory memory than are numbers. Kershner (32) found indications that the number of words per 2,000 typed spaces might be a factor of significance in determining reading speed.

The prediction and factor analytic studies reported by Drew (11), Fortna (15), Hood (26), and Long (42) were referred to in an earlier section of this review. Cloze techniques or procedures were involved in several studies also referred to earlier (19; 47; 74). Hafner (19) was interested in finding what relationships existed between the cloze, and certain cloze related variables, and various measures of intelligence, vocabulary, information, personality, achievement, and reasoning. He found that while those variables did not play a significant role in prediction of college grade-point average, the cloze did compare favorably with standard

predictors as a predictor of course grades. Weaver (50) found significant differences in the ability of college juniors and seniors to predict words in a cloze-type situation, with the difference favoring the bilateral context rather than the unilateral context situation. Mitchell (47) found a positive relationship between a cloze test and reading efficiency.

Locally devised or adapted forms of established or existing tests were used in a number of studies (e.g., 1; 19; 25; 32; 39; 68; 70), although this type of measuring instrument was usually not the only one used. A number of investigators used experimental editions of tests. Hafner (19) used experimental editions of an intelligence and a general information test. Hill's study (25) involved use of an experimental flexibility test. Moe (48) discussed his *Flexibility Profile Test* and the *Flexibility Index* determined with it (difference between silent reading speed in simple materials as compared with speed in college level materials). The various experimental tests used by Taylor for measuring aspects of listening skill (69) were discussed earlier. Kittross (36) found that none of the message techniques he used to obtain interest indices (a cloze technique, a test of retention of content interrupted with an interfering message, and proofreading) produced a satisfactory predictor of index of interest value. Young (78) presented his *Reading Depth Attitude Sentence Completion Test* and discussed its development and the determination and explanation of the seven diagnostic categories involved.

Several college chemistry and physics texts were involved in a study, conducted by Jacobson (28), to determine relative reading difficulty of textbooks. Jacobson developed an underlining test in which difficulty of passages was determined, in part, by the number of words underlined by students. Variables used in regression equations for predicting difficulty of material included average underlining score, average words per sentence, concentration of simplified mathematical terms, average number of syllables per word, and concentration of words not on the first 6,000 of the *Thorndike-Lorge Word List* and of words not on *Powers' List of Common Science Words*.

Ironside (27) did an analysis of twenty recent college reading improvement practice materials. He found eleven of the twenty giving varying amounts of perceptual practice (practice in perception and word recognition), with varying explanations or reasons for the practice being given in the different materials.

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